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THE INDIAN ECONOMIC JOURNAL

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A DIAGRAMMATIC REPRESENTATION OF THE POLICY OF ACCOUNTING PRICES

ACCOUNTING prices are defined as a set of factor prices which, if followed in practice, will lead to the introduction of the optimal technology and hence to the maximisation of total value of output, given the community's preference schedule and factor endowment. In other words, the accounting prices of factors are the set of prices which are in *equilibrium* with the optimal technology as defined above. In what follows, we shall consider only the basic factors of production, labour (L) and capital (K). For the sake of simplicity we shall assume that the taste of the community does not change, that is, the relative quantities of the final commodities produced remain unchanged, so that all the commodities can be expressed in terms of one commodity, i.e., the national product (P). Further, we shall base our discussion on a system of continuous production functions represented by convex production contours, each curve representing one level of production and a higher one a larger level.

In most of the underdeveloped countries, an accute shortage of capital exists with an abundant labour force. A number of reasons may be given for such a phenomenon :

1. A high rate of population increase with a low rate of savings ;
2. State cheap money policy and enforcement of minimum wage laws ;
3. Existence of large frictional elements in the economy etc.

These lead to chronic structural disequilibrium and persistent maladjustment in factor utilisation, resulting in the production of a volume of output which is less than what can be produced by employing all the factors fully through introducing alternative (optimal) techniques. In figure 1, OL is the total labour force available and OL is the amount utilised and $OK=O\overline{K}$ is the total amount of capital available and utilised. Point $\overline{P}$ represents the level of national product which is produced by the existing techniques of production that utilise labour and capital in the proportion $O\overline{L}/OK$. Point P re-

presents the maximum level of output which can be produced by the available factors of production. The optimal techniques associated with P utilise labour and capital in the proportion OL/OK i.e., in the proportion in which they are available. The policy of accounting prices is a device to introduce the techniques associated with P in place of those with $\bar{P}$.

Let us now look at the factor prices that are in equilibrium with the techniques associated with $\bar{P}$ and P. In figure 1, the ratio of factor prices at Point $\bar{P}$ is given by the slope of the tangent to the production contour. These are the actual market prices prevailing before the introduction of the accounting prices. Let the market wage rate be denoted by $\bar{w}$ and the market interest by $\bar{r}$, then

$$\frac{\bar{w}}{\bar{r}} = \frac{OA}{OB}$$

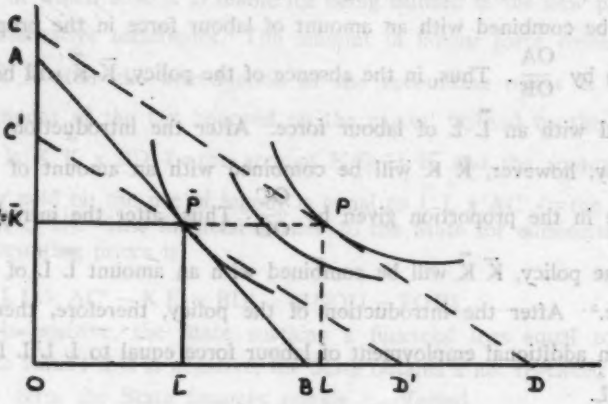
The factor prices that are in equilibrium with the techniques associated with point P are the accounting prices. Let the accounting wage rate be denoted by w and the accounting interest rate by r, then

$$\frac{w}{r} = \frac{OC}{OD}$$

We can express the accounting prices of factors in terms of the market prices. This has been done in figure 1, by drawing a straight line C′D′ through $\bar{P}$ parallel to CD. Figure 1 shows that if the market price of labour is reduced from OA to OC′ and the market price of capital is raised from OB to CD′, the ratio of the prices of labour and capital will equal the ratio of the accounting prices of labour and capital. In actual practice, as we know the market prices of labour and capital, we can determine, in absolute terms, the extent to which these prices have to be changed so that their ratio equals that of the accounting prices. In a private enterprise economy, however, it is not possible to replace the market prices directly by the accounting prices. To scale down the wages is a practical impossibility, and to scale up the interest rate is not possible without direct control of all lending institutions and detailed regulations of the purpose of the loans. As we are interested in inducing the producers to adopt the optimal technology, no attempt need be made to change the market prices in general. The objective can be obtained by making the unit cost of factors *to the producers* equal to the accounting prices at the current level of output and the availability of factors. This can be done by levying a tax, on the use of factor whose accounting price is more than the market price, equal to the difference between the two per unit, and by paying a subsidy, on the use of factor whose accounting price is less than the market price, equal to the difference between the two. In terms of fig. 1, this can be done by

levying a tax on the use of capital equal to BD′ and by giving a subsidy on the use of labour equal to AC′.

Figure 1

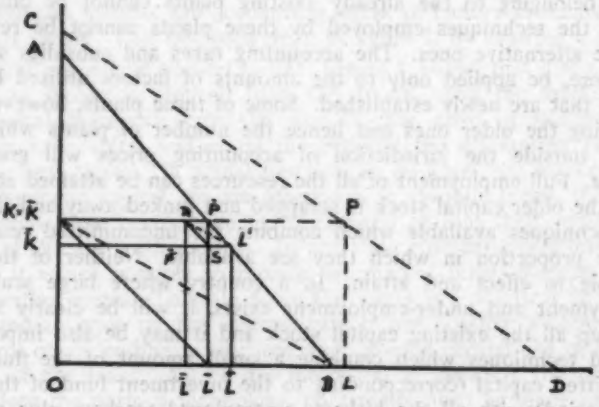


It must be emphasized here that the form of the capital equipment belonging to the already existing plants cannot be changed; hence the techniques employed by these plants cannot be replaced by the alternative ones. The accounting taxes and subsidies should, therefore, be applied only to the amounts of factors utilised by the plants that are newly established. Some of these plants, however, are replacing the older ones and hence the number of plants which remains outside the jurisdiction of accounting prices will gradually decline. Full employment of all the resources can be attained at once, if all the older capital stock is scrapped and junked away and if there are techniques available which combine the uncommitted resources in the proportion in which they are available. Neither of these is possible to effect and attain. In a country where large scale unemployment and under-employment exists, it will be clearly foolish to scrap all the existing capital stock and it may be also impossible to find techniques which combine a small amount of the fluid uncommitted capital (corresponding to the investment fund of the current period) with all the hitherto unemployed workers plus all the workers released from the capital stock scrapped. The absorption of surplus labour will, therefore, be a gradual process, and full employment will be attained only when all the existing capital stock has depreciated.

Figure 2 shows the difference between the amounts of labour employed in the first period, with and without the policy. $OK=O\bar{K}$

represents the total amount of capital available out of which $\bar{K}\ \bar{\bar{K}}$ represents the uncommitted amounts which can be used in alternative techniques. In the absence of the policy of accounting prices, $\bar{K}\ \bar{\bar{K}}$ will be combined with an amount of labour force in the proportion given by $\frac{OA}{OB}$. Thus, in the absence of the policy, $\bar{K}\ \bar{\bar{K}}$ will be combined with an $\bar{L}\ \bar{\bar{L}}$ of labour force. After the introduction of the policy, however, $\bar{K}\ \bar{\bar{K}}$ will be combined with an amount of labour force in the proportion given by $\frac{OC}{OD}$. Thus, after the introduction of the policy, $\bar{K}\ \bar{\bar{K}}$ will be combined with an amount $\bar{L}\ \dot{\bar{L}}$ of labour force.[1] After the introduction of the policy, therefore, there will be an additional employment of labour force equal to $L\ L\ \bar{L}\ \dot{\bar{L}} - \bar{L}\ \bar{\bar{L}} = \bar{L}\ \dot{\bar{L}}$.

Figure 2



[1] This can be explained as follows: $\bar{K}\ \bar{\bar{K}} = \bar{P}S$. Draw SR parallel to $\bar{L}\bar{K}$ and $R\bar{L}$ perpendicular to the horizontal line to find $R\bar{P} = L\ \bar{L}$, the amount of labour-force employed with $\bar{K}\ \bar{\bar{K}}$ in the absence of the accounting prices. Again RL' parallel to $\bar{K}\ L$, to find $\bar{P}\ L' = \bar{L}\ \dot{\bar{L}}$, the amount of labour force employed with $\bar{K}\ \bar{\bar{K}}$ after the introduction of accounting prices.

We now turn to study the financial burden which the State will have to bear for administering the accounting prices. We shall consider the first period only.[3] In Figure 3 $O\bar{K}$ is the total amount of capital of which $\bar{K}\,\bar{\bar{K}}$ is available for being utilised in the new plants with alternative techniques. The amount of labour force combined with $\bar{K}\,\bar{\bar{K}}$ after the introduction of the accounting prices is $\bar{\bar{L}}\,\dot{\bar{L}}$. The amount of the tax imposed on the capital utilised by the new plants is $\bar{K}\,\bar{\bar{K}}$ x BD′ (=the area of F G H I), and the amount of subsidy paid on the use of labour is equal to $\bar{\bar{L}}\,\dot{\bar{L}}$ x AC′ (=the area of M N Q U). Hhe financial burden to the State for administering the accounting prices is

$$\bar{\bar{L}}\,\dot{\bar{L}} \times AC' - \bar{K}\,\bar{\bar{K}} \times BD' = MNQU - FGHI \quad \ldots \quad \ldots \quad \ldots \quad (1)$$

If (1) is positive, the State sustains a financial loss equal to its absolute value; if it is negative, the State obtains a net revenue; and if it is zero, the State finances remain unaffected.

From Fig. 3, we can also see the total value of output that can be produced, in period 1, in the absence and after the introduction of the policy of accounting prices. Under conditions of competitive equilibrium the marginal productivity of a factor equals its price and the value of total output is equal to the sum of the amounts of factors utilised multiplied respectively by their marginal productivities. In period 1, the total receipts of labour employed in the absence of the accounting prices will be $O\bar{L}$ x OA (= the area of the rectangle $OAE\bar{L}$) and the total receipt of capital will be $O\bar{K}$ x OB (=the area of the rectangle $OBF\bar{K}$). The total value of output at point $\bar{P}$, which represents the value of output in the absence of the policy is $O\bar{L}$ x OA+ $O\bar{K}$ x OB = $OAE\bar{L}+OBF\bar{K}$.

After the introduction of the policy of accounting prices the value produced by (or imputed to) labour will be $O\bar{\bar{L}}\times OA+\bar{\bar{L}}\,\dot{\bar{L}}\times OC'$. The value imputed to capital will be $O\bar{\bar{K}}\times OB+\bar{K}\,\bar{\bar{K}}\times OD'$. The total value of output produced, in period 1, after the introduction of the policy of accounting prices will be $O\bar{\bar{L}}\times OA+\bar{\bar{L}}\,\dot{\bar{L}}\times OC'+O\bar{\bar{K}}\times OB$ $+\bar{K}\,\bar{\bar{k}}\times OD'=OA\bar{\bar{M}}\bar{L}+\bar{\bar{L}}NQ\dot{L}+OB\bar{\bar{G}}\bar{K}+\bar{K}\,\bar{\bar{K}}HI$. The increase in the

[3] In this paper we shall consider period one only; in the following periods, the same analysis will apply.

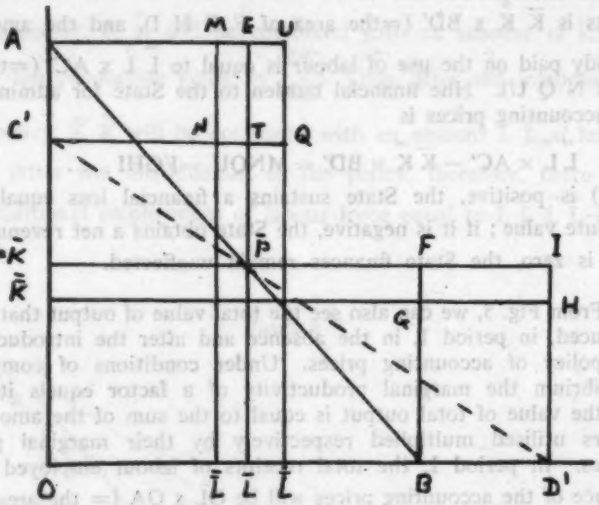
value of output due to the introduction of the policy is

$$\bar{O}AML+\bar{L}NQ\dot{L}+OBG\bar{K}+\bar{K}\,\bar{K}HI-OAEL-OBFK$$

$$=\bar{L}TQ\dot{L}+FGHI-MNTE \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (2)$$

Given the convexity of the production curves, (2) is always positive.

Figure 3



In order to see the effect of the policy on the savings, we have to compare the increase in the total amount of income accruing to the owners of factors and the proportion of it being spent with the increase in the value of output. As in the administration of the policy, the rates of remuneration to the factors of production remain unchanged, the increase in the incomes earned will be equal to the increase in the amounts of factors employed multiplied by the rates of remuneration. As the amount of capital is the same in both the cases, the income accruing to the capital owners remains the same after the introduction of the policy. The amount of labour employed is, however, increased by $\bar{L}\,\dot{L}$ due to the introduction of the policy. The total additional income accruing to the labourers over what would have done otherwise is $\bar{L}\,\dot{L}\times OA=\bar{L}\,\dot{L}\,UE$. If the labourers spend all their earnings on consumption, then the effect of the policy

savings can be determined by deducting $\bar{L}q\dot{\bar{L}}$ UE from (2). It is

$$\bar{L}TQ\dot{L}+FGHI-MNTE-\bar{L}\,\dot{L}UE=FGHI-MNQU \quad \ldots \quad (3)$$

If (3) is positive, volume of savings is increased by the introduction of the policy; if it is negative, the savings are decreased; and if it is zero, the savings remain unaffected.

In actual practice[3], however, not all the income accruing to the newly employed labour force is spent on consumption. Hence the increase in savings is likely to be greater than that given by (3).

Aligarh. A. QAYUM

[3] Some quantitative estimates have been made for (1), (2) and (3) in A. Qayum: *Theory and Policy of Accouting Prices*, North Holland Publishing Co., Amsterdam 1960.

LESSONS FOR UNDERDEVELOPED COUNTRIES FROM THE JAPANESE EXPERIENCE OF ECONOMIC DEVELOPMENT*

IT would appear that many underdeveloped countries have tended to neglect the Japanese experience of economic growth, looking instead to the rather more extreme idealized models of Western private competition or Soviet central planning. Yet the objective conditions of Meiji Japan appear in numerous ways more nearly akin to those of the presently underdeveloped countries than those underlying either the Western European or Russian cases. Furthermore, Japan's economic success is without dispute.

I see the Japanese model as essentially a deviant from the Western private competition case; I shall illustrate it first by describing briefly the general pattern of Japanese growth and then by analyzing some of the strategic factors—namely, the role of the State, entrepreneurship, technology, the labor force, capital formation, and factor proportions. From this discussion are drawn the lessons with which the paper concludes.

Three phases, more of degree than of kind, may be distinguished in Japan's modern economic development. The first is the period from the Restoration (1868) until roughly 1910 or so, which I shall characterize by the phrase "establishment of the foundations for industrialization;" this period is the most important for the purposes of this paper. Second, from the beginning of World War I to World War II, is "the drive to industrial maturity." The period since World War II may be chracterized as "reconstruction and growth in a mature industrial economy." The following discussion centers on the first two phrases, and especially the first, rather than on the amazing events of the past ten years, since the more relevant lessons for presently underdeveloped countries are derived from this earlier experience.

I

In the early part of the first period, from 1868 until 1880 or so, the most important thing that happened in the Japanese economy was the establishment of a setting that was conducive to growth. This took many forms. Political stability, combined with a general

* This is an expanded and slightly revised version of a paper presented at the annual meeting of the Association for Asian studies, Chicago, Illinois, U.S.A., on March 28, 1961.

identification with national goals, was achieved. The concept of economic growth was not only widely accepted but became a national slogan. Flexibility in the utilization of factors was greatly enhanced by clearing away the legal and political obstacles to freedom of ownership of land, occupation, and movement for labor, and by institutional reforms in law, taxation, currency, banking and other areas. Consumption and saving relationships were altered, especially in the redistribution of income away from the *daimyo* lords and their retainers. A start was made at bringing in foreign knowledge and at disseminating it, both through a government drive for general basic literacy, and emphasis on a wide variety of technical skills through vocational schools, the hiring of foreign technicians, sending missions and students abroad, importing machinery, and so on.

Industrialization proceeded very slowly before the mid-1880's, and even then when the pace quickened considerably, in terms of its contribution to the total output of the economy, the industrial sector continued to produce less than agriculture until well into the twentieth century.[1] A recent statistical study[2] has illuminated the point that the economic structure of Japan in 1914, some 45 years after the Restoration, was what would be expected for a composite underdeveloped country today of the same population and level of *per capita* output. It was not until later that the scarcity of natural resources and the concomitant drive toward industrialization to achieve growth resulted in an economic structure for Japan in which industrial activity played a significantly larger part than would be expected of a country of its population and income level. On the other hand, the overall output of services was just about what would be expected throughout the entire period.

Although the general level of Japanese industrial production was in these terms normal in 1914, several sectors already displayed greater than normal development, notably textiles, machinery, and transport equipment. These reflect the twin stimuli to industrialization of the earlier period : comparative advantage of textiles, including silk, in an open economy of quite free internal and external markets ; and deliberate government policy to develop the machine

[1] Output of the primary sector represented more than half the national income produced until 1898, and more than that of the secondary (industrial) sector until 1928 ; for agriculture alone the corresponding dates are about 1892 and 1922. Cf. Kazushi Ohkawa, *The Growth Rate of the Japanese Economy Since 1878*. (Tokyo : Kinokuniya, 1957), pp. 26, 72-73, 248.

[2] Chenery, Shishido, and Watanabe, "The Pattern of Japanese Growth, 1914-1954," (Starford University, Department of Economics, June 1960), Memorandum No. H-3 (Revised, mimeographed), pp. 7-11. For a more general treatment, see also H. B. Chenery, "Patterns of Industrial Growth," *American Economic Review*, Vol. L., No. 5 (September 1960), pp. 624-54.

and transport industries. Too much should not be made of the quantitative impact of heavy industry in this early phase of growth. In 1914, light industry, mainly food processing, beverages, tobacco and textiles, accounted still for about 2/3 of total factory production and, if handicrafts are included, for more than ¾ of total industrial output.[3] Thus, in the first phase of Japan's modern economic development it was light industry, spearheaded by cotton and silk textiles, which provided, quantitatively and probably in terms of labour productivity, the major impetus for industrialization.

The foundations for industrialization were built at least as much in agriculture as they were in industry *per se*. Agriculture must play an extremely important role in the early drive to sustained growth in an underdeveloped country; Japanese agriculture was successful to an amazing degree in achieving those objectives instrumental in initiating the growth process.[4] Net agricultural output more than doubled in the thirty years from 1878. Rice output went up by 70 per cent which was just about enough to meet the increased demand for food; food imports did not become important until the next phase of Japan's growth. Japan was very responsive, in terms of increasing output and improving and standardizing quality, to its opportunities in foreign markets; this is particularly well demonstrated in the importance of silk as a foreign exchange earner, continuing until the early 1930's. With all the increase in output, the labor force in agriculture actually declined slightly despite a steady increase in the total labor force; a major factor in the growth of the period was the shifting, through income incentives, of surplus labor in agriculture to higher productivity non-agricultural production.

Comprehensive quantitative assessment of the real saving of agriculture is considerably less than perfect. The tax burden on agriculture was heavy. A little more than two-thirds of the direct tax burden of the economy in the period 1878-1912 is allocable to agriculture; moreover, the burden relative to sectoral net income produced was three times as high in agriculture as in the rest of the economy.[5] The land tax was the major central government item of tax revenue in early *Meiji*, constituting more than half of total taxes until 1890. Even so, voluntary saving in the agricultural sector was not insignificant. No estimates are available on agricultural

[3] Chenery, Shishido and Watanabe, *Ibid.*, p. 7.

[4] The following is based heavily on Ohkawa and Rosovsky, "The Role of Agriculture in Modern Japanese Economic Development," *Economic Development and Cultural Change*, Vol. IX, No. 1, Part II, (October 1960), pp. 44-52. See also Ohkawa, *op. cit.*, and G. Rains, "The Financing of Japanese Economic Department." *Economic History Review*, Second Series, Vol. IX, No. 3 (1950), pp. 440-454.

[5] Derived from Table 6 in Ranis, *op. cit.*, p. 448.

saving in kind which resulted in agricultural investment; there no doubt was some. In addition, rich peasants and landlords used their saving for direct investment in local enterprises. Finally, saving was channelled to industry through newly developed financial institutions, such as savings and other banks and the postal savings system, which were on the whole highly successful in accumulating the savings of even quite poor farmers.

How was such success in agriculture achieved? The most credit must be given to innovation in its broadest sense of increasing economic efficiency. Some improvements in production methods required fairly heavy and lumpy capital investment, such as land improvement through irrigation, drainage, and reclamation. It is extremely difficult to estimate how extensive and how significant such innovation *cum* investment was. Perhaps even more important was the rapidly increased use of commercial fertilizers, for which the capital requirements were much smaller, shorter in term, and thus much less lumpy. Moreover, there were a number of important innovations in agricultural production techniques which required virtually no investment at all, such as utilizing superior seed strains, selection of seeds, and better methods of crop cultivation by such things as use of narrow oblong seed beds, regular planting in rows, and the like.[6]

Technology was not the full answer, of course. As indicated, there was some capital formation, though presumably not in startlingly large amounts. Furthermore, while land productivity increased about 80 per cent, there was also an increase in land under cultivation of about 35 per cent.[7] Since the quantity of agricultural labor input declined,[8] labor productivity more than doubled during the early phase of development, growing at as rapid a rate as, though at a lower absolute level than, labor productivity in the secondary or tertiary sectors. And all of this was accomplished without revolutionary changes from the traditional patterns of organization and small size of the agricultural production unit which had evolved in the *Tokugawa* period. What seems to have motivated all this activity were traditions of frugality and hard work, and widespread responsiveness to profit incentives (as evidenced for example by the

[6] For a fascinating study of improvements in agricultural technology, the role of the government and others in facilitating adoption of these techniques, and the motivations underlying the response of the innovators, see R P. Dore, "Agricultural Improvement in Japan: 1870-1900," *Economic Development and Cultural Change*, Vol. IX, No. 1, Part II (October 1960), pp. 69-91.

[7] Ohkawa and Rosovsky, *op. cit.*, p. 46.

[8] As measured by the number of workers in agriculture. It may have been that those who remained in agriculture worked more hours than before, though I know of no evidence on this point.

development of silk), all reinforced by Imperial edict and other forms of moral suasion from above.

II

As the first phase of Japan's growth merges into the second, we see quite different factors becoming dominant in the growth process and a different pattern of growth emerging. Agriculture gradually become a drag on the economy. In part this reflected the fact that the non-agricultural sector was by this time coming to generate both most of its own saving to finance its investment and a significantly rising proportion of its increases in labor from its own urban population, and providing the major market for its output. At the same time, in agriculture, total output and labor productivity grew at much slower rates than earlier. The slack had been taken up, additional land was not brought into cultivation, perhaps the pool of technological knowledge had more or less siphoned off, given the size and structure of the production unit. I think probably the government policy after World War I of cheap rice imports from Korea and Taiwan did much to limit subsequent incentives and opportunities in Japanese agriculture.[9]

It was in the period from the beginning of World War I until the beginning of World War II, then, that industrialization really came to play a dominant role in the economy. World War I itself provided an excellent opportunity to increase both export and import-competing industrial production and to diversify it. By 1935, factory production was almost half again as much as would have been expected of a country of Japan's population and *per capita* income. Although industry generally developed along the more diversified lines that would be expected, textiles, machinery, and transportation equipment industries again reflected exceptionally rapid growth as compared with what would have been expected,[10] and for the same reasons as earlier.

How do we explain why this industrialization occurred? In general terms, and starting from the demand side, it was the combination of domestic demand for final goods plus the foreign demand for Japan's exports which stimulated industrial activity, while import substitution was much less important, probably because of the rapid growth of exports and easy access to foreign sources of raw

[9] See Jŭng-Chao Liu, "An Econometric Model of the Rice Market in the Japanese Empire, 1910-1937," (University of Michigan: 1960), unpublished Ph.D. dissertation.

[10] Chenery, Shishido, and Watanabe, *op. cit.*, p. 46.

materials.[11] On the supply side, probably the most important determinant was a negative one : Japan had such a poor endowment of natural resources that by far the most efficient way to improve the level of living was to develop the trade pattern of a highly industrialized country, exporting manufactured goods and importing raw materials. Japan overcame this very severe handicap; there was a continued rapid increase in the absorption of labor into industrial uses; more important, labor productivity increased even more rapidly. Only one-third of the increased non-agricultural output is attributable to additional labor inputs, while two-thirds was achieved by the increase in labor productivity, just the reverse of the first period.[12] Increases in labor productivity were particularly large in electricity, rubber and non-metallic minerals, where the gap between old technology and new was great, and in textiles, presumably in response to competitive foreign markets.[13] The increase in labor productivity was in part due to increases in labor quality, through education, special training, and the like. Probably more important were the increased amounts of capital per worker and the technological improvements of the period.

Capital formation, which was apparently relatively small and considerably less important earlier, increased quite rapidly during the interwar period. On the basis of available data, gross investment, excluding military durables and most agricultural investment, averaged about 8 per cent of net national product in the 25 years between 1889 and the beginning of World War I; in the next 25 years this rate more than doubled, to about 17.5 per cent.[14] We have no such clear-cut measure for technological innovation, but I suspect that it was just as important as capital formation.[15]

[11] By using as a measure deviation from equi-proportional growth of all sectors, Chenery, Shishido and Watnabe were able to attribute 57 per cent of such deviations to final demand factors, 35 per cent to exports, and only 8 per cent to import substitution for the period 1914-35. *Ibid.*, p. 24.

[12] Based on the unpublished research of Professor Kazushi Ohkawa of Hitotsubashi University. A more thorough discussion, both theoretical and empirical, of aspects of this point appears in K. Kojima, "Capital Accumulation and the Course of Industrialization, with special reference to Japan," *Economic Journal*, Vol. LXX, No. 280, (December 1960), pp. 757-68.

[13] Chenery, Shishido and Watanabe, *op. cit.*, Table 11, p. 45.

[14] Calculated from Rosovky, *op. cit.*, Table 3, pp. 356-7. The use of *gross* investment and *net* national product, as well as the exclusion of agricultural investment, is dictated by the limitations of the data; I exclude military durables as unproductive.

[15] For the period 1914-1954, Chenery, Shishido and Watanabe estimate that 40 per cent of the increased share of industrial output above proportional expansion can be attributed to technological and substitution factors lumped together, with import substitution and final domestic demand and export demand for accounting for the rest. *op. cit.*, p. 35. For a quantitative assessment of the importance of technical change, see R. M. Solow,

(continued on page 156)

III

Turning to a more specific discussion of some of the strategic factors in Japan's growth process, first the matter of the role of the State. This has been a widely debated issue; I have no intentions of attempting to resolve it here. Certainly it is granted that the government played an important role; what I want to emphasize is that we must examine rather precisely the nature and specific areas of State activity.

In the dynamic analysis of an economy, clearly anything that the government may or may not do will have some positive or negative impact on the growth of the economy. In the case of Japan, it is clear that one of the most important contributions of the *Meiji* and successor governments was the establishment and maintenance of an institutional framework very conducive to economic growth. A number of the specific measures have already been mentioned, and there is no space for further detail. In addition, the government was very active in the provision of certain public services, especially education and, euphemistically, defense. The government's program of education made an extremely important contribution in the direct economic sense of upgrading the quality of the labor force and making possible the dissemination of Western technology. While early military expenditures may have been essentail for internal security and order and to contain the potential foreign threat, later military adventures, though no doubt a dominant factor (especially on the demand side)[16] in the development of certain heavy industries, were a rather unfortunate way of using up the growth in output of the economy. It seems probable that Japan did not obtain as large an economic return, in terms of colonies, spheres of influence, reparations and the like, on its investment in military activities as would have been derived from additional domestic capital formation, even excluding the disastrous results of World War II.[17]

"Technical Change and the Aggregate Production Function." *Review of Economics and Statistics*, Vol. 39, No. 3 (August 1957), pp. 312-20. See also H. J. Bruton, "Innovation and Equilibrium Growth," *Economic Journal*, Vol. LXVI, No. 263, (September 1956), pp. 455-66.

[16] See Rosovsky, *op. cit.*, especially, p. 372.

[17] Note, for example, the much more rapid growth rates of the Japanese economy in the decade of the 1950's compared with pre-World War II; the contemporary Government share of GNP is not larger, but the composition has shifted from military expenditure to further social overhead capital expenditures. For a somewhat different view, see M. Bronfenbrenner, "Some Lessons of Japan's Economic Development, 1853-1938," *Pacific Affairs*, Vol. 34, No. 1 (Spring 1961), p. 25. Bronfenbrenner's article appeared after this was written; in many ways it is complementary to rather than competitive with this paper.

The government provided a major stimulus to the provision of economic social overhead capital, in some cases for strategic purposes in advance of the requirements of the economy. This no doubt provided further opportunities for the expansion of markets and thereby production. The development of the railroad system is a case in point. While in the first few years of *Meiji* the government undertook its own investment in railroads, soon it turned to stimulating private development of railroads by loans, technical assistance, guaranteed dividend rates, and other measures. Once the government nationalized the railroads between 1906-1909, its investment in railroads constituted about half of its total investments until World War II.[18]

By and large the State used the private market mechanism to allocate resources and to obtain its objectives generally, exerting its influence through the market (via tariffs, subsidies, differential tax rates, purchases, and the like), rather than replacing the market through government planning or production. After a few years of ownership and unprofitable operation of former *daimyo* mines and factories and of newly established "model enterprises," and consonant with its belief in the efficacy of a system of private enterprise, the government in 1882 sold out and retired from an active role as an entrepreneur, except for such things as its tobacco monopoly for revenue purposes and the iron and steel and munitions industries for strategic purposes. Quantitatively, the output of State-owned enterprises was rather small; as late as the eve of World War I Japan imported two-thirds of its steel.[19] In other words, except at the very beginning the government was not important as an industrial producer and its contribution to the growth of the economy did not lie in State-owned industrial enterprise.

One further area where the government's contribution to growth was particularly significant is that of technology. I have emphasized that technological innovation, in agriculture and in industry, must be given a major share of the credit for Japan's growth. The government made strenuous efforts to import foreign technology, to disseminate it, and to provide appropriate incentives for farmer and manufacturer alike to adopt the new techniques.

The direct activity of the State in promoting innovation was more paramount in the earlier phases of Japan's growth than later on. Gradually, expanding markets and profit opportunities stimulated more and more technological improvements under private initiative,

[18] Rosovsky, *op. cit.*, pp. 68-9.

[19] W. W. Lockwood, *The Economic Development of Japan*, (Princeton University Press: 1954), p. 24. This paper relies much more heavily on Lockwood's pioneering study than is evidenced in footnotes.

especially in the industrial sector. Because in fact it is extremely difficult to separate out the technological component from the capital investment component in the installation of a new machine, for instance, we have tended to attribute the major area of technological improvement in Japan to big business using large-scale, capital-intensive, and most modern production methods. Clearly, however, a sizeable proportion of the high labor productivity achieved in such circumstances must be attributed to the capital component. It may well be, as some have argued, that as much emphasis should be given to the technological contribution to increased labor productivity through the "myriads of relatively simple improvements in technology which do not depart radically from tradition or require large units of new investment,"[20] in small industry as well as agriculture. The point can probably be made, however, that the *zaibatsu* conglomerates and other large businesses were the innovational leaders in the private sector, and the new knowledge and the willingness to use it trickled down to small businesses from large.

The whole question of capital formation is inextricably tied in with the matter of technology, because while technological innovations might be put into use without much capital formation, given Japan's rapid process of industrialization based mainly on foreign know-how, most capital formation embodied considerable technological improvements. Nevertheless, considering capital formation as a separate variable for a moment, it would appear that capital formation was less important than other causal factors in the growth process in *Meiji* Japan, and it was not until World War I or so that it became more significant. Until 1910 or so, gross capital formation[21] was probably less than 10 per cent of gross national product, although the lack of any estimates of investment in agriculture mean this statement should be viewed with some caution. Nevertheless, it was the rapid growth of the earlier period, combining with a high effective marginal propensity to save on the part of the economy as a whole, which generated steady increases in the proportion of investment to total output. In turn this capital formation assumed a major role in causing the industrialization of the interwar period.

Two final points about capital formation. First, much of the investment was carried out by the government, mainly in railroads and other areas of social overhead capital; over the fifty years 1889-1938 it is estimated that about 45 per cent of gross investment, excluding military goods and agriculture, was government investment.[22] Second is the fascinating story of how the saving was generated which fin-

[20] *Ibid.*, p. 198.

[21] I exclude government expenditure for military construction and equipment from capital formation.

[22] Rosovsky, *op. cit.*, Table 3, pp. 56-57.

anced the high rate of investment that did take place. There is space only for an outline picture.

Though foreign borrowing on a net basis was negligible for the entire period up to World War II, it assumed considerable importance between 1896 and 1913;[23] with the beginning of world War I Japan became an international lender rather than borrower. Government saving from tax revenue was an important component of the financing of government investment. Mainly, however, domestic saving was generated privately and voluntarily. The Japanese, both rich and poor, are a frugal people. The saving of the poor was channelled through financial institutions to finance business investment. Business, from the smallest family firm producing at home to the largest *zaibatsu*, plowed back earnings into productive investment. These earnings were good because of expanding opportunities in domestic and foreign markets, and were probably abetted by the mild inflationary trend. The tax system, government policy in general, the structure of production and of markets promoted a high degree of income inequality. The rich lived relatively unostentatiously, saved a high proportion of their income, and made their saving available, either directly or indirectly, for productive investment. Since the will to invest was there, one way or another the saving was forthcoming, in part through the reallocative effects of inflation.

Population and labor force grew rather slowly from the beginning of *Meiji* until World War II compared with the experience of many underdeveloped countries today; population increased on the average about 1.2 per cent annually, and the labour force somewhat more slowly.[24] The contribution of labor to growth, in addition to the increased supply, was twofold: the quality of labor significantly improved through general education and technical training; and incremental increases in labor were absorbed in higher productivity industrial and service uses rather than in low productivity agriculture. Moreover, the agrarian system of primogeniture combined with the traditional family system to encourage the syphoning off of younger sons and daughters into industrial uses as marginal income earners, so that wages could be kept quite low.

This discussion of the various factors of production leads inevitably to the question of factor proportions, and the related matter

[23] During this period net capital inflow averaged almost 3½ per cent of net national product, as caluculated from Lockwood, *op. cit.*, pp. 254-256, and Ohkawa, *op. cit.*, p. 247. Of this almost one percentage point represented reparations, mainly from the Sino-Japanese war of 1895; the rest is covered by government bonds sold abroad; direct investment in Japan in this period was negligible.

[24] Estimated from I. Taeuber, *The Population of Japan*, (Princeton University Press: 1958), pp. 45, 81, 311.

of dualism in factor productivity. Land can be dismissed quite simply : land was relatively fixed in supply; the initial man-land ratio was very unfavourable to labor and it has continued to worsen ; the capital-land ratio initially was low but the capital stock has grown rapidly. More interesting is the matter of labor-capital ratios, and their observed difference between agriculture and industry, and between large-scale industry and small. In general, in industry until about 1910 labor increased more rapidly than capital, on the basis of relative prices, so that the relative scarcity of capital increased ; after that, capital formation increased more rapidly, and relative prices indicate the increasing relative abundance of capital which justified the observed shift to more capital-intensive methods of production.[25]

Static theory leads to the conclusion that output is maximized where the marginal productivity of a factor is equal in all uses. Is what has been termed the technological dualism[26] of widely different marginal productivity of labor in its use in capital-intensive, relatively fixed-proportions sectors and in labor-intensive, variable-proportions sectors necessarily all that bad ? The Japanese experience would suggest not, for essentially dynamic reasons. First, some dualism is probably necessary simply to overcome the inertia of agricultural labor ; there must be sufficiently higher wages in industry, reflecting higher marginal productivity, to induce labor to move. Japan was quite successful in integrating industry into the rural way of life by sub-contracting, moving factories to rural areas, and by setting up dormitories for contracted rural labor ; this kept the necessary wage differential and labor costs down.

Second, the range of technological possibilities in combining factors may be quite limited, especially in heavy industries. Usually, as a corollary investment is lumpy and there are considerable economies of scale. Technological innovation at the most advanced level is normally carried out by advanced industrial economies, where there probably is a bias toward research in innovation of a labor-saving nature ; this exacerbates the borrowing problem for the labour-surplus, capital-poor economy. This can be met in part by adapting Western technology to more labor-intensive inputs. Japan was successful to some extent in doing this. More important, the economies of scale and the demand for the output of certain types of capital-

[25] See G. Ranis, "Factor Proportions in Japanese Economic Development," *American Economic Review*, Vol. XLVII, No. 5, (September 1957), pp. 594-607.

[26] See R. S. EcKaus, "The Factor-Proportions Problem in Underdeveloped Areas," *American Economic Review*, Vol. XLV, No. 4, (September 1955), pp. 539-65. The term "dualism" is a simplification since there may be several different levels of capital intensity and labor productivity in different parts of the economy.

intensive industries in which relatively little technological flexibility has emerged may justify this sort of investment pattern to maximize output. In these circumstances, the dualism is accepted; what becomes important is that the now-surplus labor be absorbed into labor-intensive uses. In Japan once again this has been quite successful. A high degree of complementarity through sub-contracting between capital-intensive large firms and small, labor-intensive firms emerged early in the development process, and has continued to be of great importance.

A third justification for dualism is that capital-intensive industries may have a greater innovational impact on the economy than the use of less capital-intensive methods. Economic efficiency may be greater, the quality of the labor force is improved more, traditions and conservative attitudes are more readily dissolved, and so forth. I think it is very easy to *say* that this has been true of Japan, as is evidenced by the rapid growth of large-scale industry and especially by the leadership role in the economy of the *zaibatsu*. Yet what bothers me is how to separate out in the growth of the *zaibatsu* that component which is due to innovation *per se*, and that due to high amounts of investment, ready access to funds, close connections with the government, and high profit opportunities implicit in oligopolistic market structures and in the internalization within the conglomerate of what would be economies external to a single firm. Perhaps the answer is that we need to view innovation in the broadest social as well as economic terms, and in this sense the dualism emerging from capital-intensive investment may be justified.

The final strategic factor considered here is entrepreneurship. The fact is that Japanese society has been wonderfully fertile in producing entrepreneurs, both large and small, who were alert to business opportunities and were willing to take the risks inherent in producing new goods or old goods in new ways. I shall confine the discussion to several issues.

First, who were the entrepreneurs? Where did they come from? Surprisingly enough, they did not, by and large, emerge from the highly developed urban merchant class; the two main exceptions are *Mitsui* and *Sumitomo*. Rather, they came instead from the ranks of the lesser *samurai* and from rural origins: sons of landlords, rural merchants, and rich peasants.[37] This was true not only of the myriad of small entrepreneurs, many of whom operated in a rural or small-town environment, but also of the top entrepreneurs of the *Meiji*

[37] For a detailed discussion and simple statistical analysis of the leading entrepreneurs in Meiji, see J. Hirschmeier, "The Genesis of Modern Entrepreneurs in Meiji Japan," (Harvard University: 1960), unpublished Ph.D. dissertation.

period. They were restless young men, with considerable education and early practical experience, who in a sense broke with the past, had great faith in Western methods, and who moved as young men to one of the large urban centers, in the quest of progress and personal advancement.[25]

This raises the crucial question as to what motivated these essentially private entrepreneurs, an issue as yet far from being resolved. To what degree were they idealistic, "commodity-centered" patriots, working for the good of Emperor and nation, or motivated rather by self-interest, for profits and for status? It becomes particularly difficult to separate these motivations, since there was a high degree of community of interests between the political oligarchs and those in business. It is true that what was good for the country was good for *Mitsubishi*, and the attitude prevailed that the reverse statement was equally true. Part of the problem is that patriotism is a most respectable justification for action based really on other less socially accepted motives. At the same time, government and top business leaders, notably *Shibusawa*, realized the importance of providing high status through honors, public recognition and the like to those "modern" businessmen who imported Western technology, built modern factories, and otherwise carried on the innovating process on a large scale. It was very neat: one could be patriotic and achieve status at the same time. Some men, such as *Shibusawa*, no doubt were essentially idealistic; many others simply paid lip service.

Yet modern enterprises normally were not profitable initially; frequently there were time lags of more than ten years before the profit rate on investment was even comparable to money market interest rates. This was particularly true until about 1890. Nevertheless, new modern enterprises continued to be established. Was this investment carried out because of patriotic motives, high expectations which often were not realised as soon as had been optimistically hoped, or a rational very long-run time horizon? While Japanese entrepreneurs certainly were not imbued with the spirit of individualistic capitalism, nevertheless I tend toward the view that most entrepreneurs were motivated mainly by self-interest, both in terms of status and of profit-making. The early entrepreneurs were overly optimistic in their expectations; the later ones did not have to be, since profit rates became high as industrialization progressed, and many new entrepreneurs appeared in response to ever-widening business opportunities.

[25] See *ibid.*, Chapter VI, and K. I. Choi, "Tokugawa Feudalism and the Emergence of the New Leaders of Early Modern Japan," *Explorations in Entrepreneurial History*, Vol. IX, No. 2, (December 1956), p. 82.

V

The degree of applicability of the Japanese model of sustained rapid growth from a low level equilibrium depends to a considerable extent upon the specific characteristics of the underdeveloped country in question, not only on the extent, nature and proportions of its economic resources, but also on the economic goals of the country, and more broadly on the entire social structure and value system of the culture. There are non-economic aspects of the Japanese case which may reduce its applicability elsewhere; for example, the high degree of cultural homogeneity, the particular hierarchic structure of society, the high value attached to hard work and thrift. Moreover, there is simply the difference in the world setting now. The main economic consideration that makes Japan an extreme case is its very poor resource base. While this necessitated a more rapid industrialization than would be required for other underdeveloped countries to achieve the same growth rate, it would suggest that if other countries followed the general outlines of the Japanese model they could achieve an even more rapid growth rate than Japan did.

The first lesson I draw from the Japanese case is that the allocation of resources by private enterprise through the market mechanism can be effective for the purposes of growth of an underdeveloped country. What this requires, and what was forthcoming in Japan, is that there are numerous entrepreneurs who respond to profit opportunities, and that the prices of factors are not highly distorted by artifiicial limitations, such as restrictions on movement, low maximum interest rates, social legislation which raises minimum wages considerably above marginal productivity, quota restrictions on imports, or unrealistic exchange rates.

Second, the government can do much to make the private market mechanism effective and can stimulate growth by providing the proper institutional setting. Included are peace and security, relative political stability, arrangements making for greater factor mobility, a tax structure which stimulates investment and discourages consumption, and numerous other aspects which reflect an attitude emphasizing growth.

In addition, the government makes extremely important other contributions through its expenditures for general education and its provision of social overhead capital such as transportation and communications, in being the leader in the movement to import foreign technology and disseminate it widely, by providing a stable market for the output of certain types of domestic industry, and by supplementing the private financial system with postal savings and long-term credit banks, whereby the small savings of large numbers are tapped to finance productive investment.

Given these arrangements, and assuming that entrepreneurial talent is forthcoming as a result, it is not necessary for the government to engage directly in the production of goods.

A third lesson is that in the early phase of growth it is important that economic policy not disregard the agricultural sector in passionate pursuit of industrial modernity. More can be done to achieve industrialization in the long run by first raising output and productivity in agriculture in order to make available a greater agricultural surplus. This is probably even more important for underdeveloped countries today than it was for Japan, given their more rapid population growth rates. The Japanese case indicates that agricultural output can be increased without revolutionary change in agricultural institutions, mainly through improvements primarily of a simple technological nature. It is important to devise means whereby such technology is widely disseminated and adopted.

This does not mean that there should be no initial offorts to industrialize. However, assuming that overhead capital is provided, the Japanese case would suggest that private enterprise should be allowed to invest in those industries where profits are the highest because of market opportunities, both domestic and foreign. Japanese texiles provide a classic example of dynamic comparative advantage. Nevertheless, in the infant stage of industrialization technical barriers may be so difficult to overcome in all attempts at modern enterprise that a government policy of technological assistance and subsidy would be justified, on the basis of Japanese experience.

Fourth, I have emphasized in this paper the major contribution I believe innovation has made to the growth of the Japanese economy. Although there were important adaptations and modifications and even Japanese inventions, essentially innovation was based, as it ought to have been, on the technology of the advanced industrial countries.

The contemporary pool of Western technology is much larger, even more capital-intensive, and probably more rigid in its factor proportions than when Japan first began to borrow. This implies that dualism in factor use because of technological factors is probably inevitable for newly developing countries ; in part this could be mitigated by borrowing from Japan, which has made labour-intensive adjustments in the Western-developed technology. Moreover, where technological factors dictate capital-intensive methods of production, emphasis should be placed on labor-intensive methods in complementary and other sectors.

Fifth, no doubt capital formation is important for economic growth. The Japanese case suggests, however, that in the early stages

of growth it is not the overwhelmingly strategic variable that much of the current literature suggests; it may be less important than innovation. Underdeveloped countries may be overemphasizing capital formation at the expense of other strategic variables.

Sixth, as regards entrepreneurship, I feel it preferable to emphasize that the lesson from Japanese experience is that the society should provide opportunities for personal advancement, both in pecuniary and status terms, for its potential entrepreneurs in order to bring about the innovations necessary for growth. Idealistic patriotism should no doubt be stressed, but no country should rely primarily on it to promote economic development under a system of private enterprise.

The final lesson, though I have not emphasized it in this paper, is that we should not forget the high prices Japan has paid for this growth, prices more in terms of the objectives of the society than of the efficiency with which these objectives were achieved. First, the Japanese goal of national power through expansion by military conquest and the allocation of a significant amount of resources to this purpose may not appeal to contemporary underdeveloped countries. However, I do not feel that the Japanese economy had to develop within the military context; if the country had been motivated to high growth for consumer welfare purposes, an even higher level of living and more rapid growth rate could have been achieved. This certainly is the experience of the period since World War II.

Next, the price paid by having a private enterprise economy with private ownership of the means of production: in its most general sense this involved no cost at all unless socialism is considered as an end in itself. In fact, it allowed growth to be obtained on a voluntary basis, through persuasion rather than coercion.

However, Japanese growth brought with it an extremely unequal distribution of wealth and income. It appears that this inequality was a stimulant to growth in the Japanese case, since the rich saved, invested in productive enterprise, and promoted the adoption of Western technology. A real conflict in goals emerges for the underdeveloped country: it must decide how much income inequality it will tolerate in order to achieve more rapid growth.

Finally, this system placed relatively little emphasis on the social welfare activities that loom so importantly in the goals of many underdeveloped countries today. Japan was no leader in the establishment of public retirement benefits, legal minimum wages, labor unions, and other programs which often inhibit rate of growth of an

underdeveloped economy. Again, the trade-off between growth in its early stages and social welfare has to be assessed.[39]

Consequently, borrowers from the Japanese experience will want to be selective, choosing those aspects most relevant, given their own resources, social structure, and goals, just as the Japanese have been selective in the course of their borrowing. However, such borrowers should beware of a narrow view of the effects of the particular lesson they utilize. The Japanese model is a comprehensive system, and any one part of the model interrelates with others such that one must think in the broadest terms of the implications of the application of any specific aspect of the Japanese experience.

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[39] Given Japan's hierarchic social system, it may not have needed such measures to ameliorate the social discontent that often accompanies efforts to industrialize, and as such had an advantage over other countries. An example of the opposite case is Germany between 1870 and 1914. I am indebted to James Crowley of Amherst for this point.

MARGINAL UTILITY, INTERPERSONAL COMPARISONS AND THE THEORY OF TAXATION*

ELSEWHERE,[1] I have developed a redefinition of the concept of marginal utility as the ratio of marginal expenditure per unit to the price per unit of any given commodity. This redefined concept has the great advantage, which the Marshallian version of it does not have, of being objectively measurable and free of hedonistic presuppositions. Among its other advantages were shown to be the following :—

(a) it satisfies the same equilibrium conditions as does Hicksian ordinal utility, thereby eliminating the principal controversy between ordinal and cardinal utility;

(b) It explains the "freak" phenomenon of "inferior" goods within the traditional framework of demand analysis, in terms of the superposition of demand shifts on elasticity movements.

In this article, an attempt is made to harness the concept to the task of interpersonal value comparisons and to give it a tryout in the field of taxation—especially in regard to progressive income taxation.

The first objective is easily achieved. Since marginal utility is defined as $\frac{\triangle E/\triangle Q}{P}$, it becomes possible to compare the marginal utilities of the expenditures of various consumers on a given commodity. This given two consumers, A and B, of a given commodity, if A's marginal utility coefficient is great than B's, it is legitimate to conclude that A currently puts a higher valuation on the commodity than does B.

Let X be a commodity currently consumed by A and B, and let its price be p_{x1} per unit. Assume that A buys a quantity h_{x1} and B a quantity k_{x1} of this commodity. If the previous quantities bought by

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[1] "Consumer's Surplus, Elasticity of Demand and Marginal Utility: A Re-examination," *Indian Economic Journal*, Vol. VII, No. 4, April, 1960, pp. 363-377.

A and B were, respectively, h_{x0} and k_{x0} at a price of p_{x0} per unit, then the marginal expenditure of A and B are respectively,

$$\frac{p_{x1} \cdot h_{x1} - p_{x0} \cdot h_{x0}}{h_{x1} - h_{x0}} \text{ and } \frac{p_{x1} \cdot k_{x1} - p_{x0} \cdot k_{x0}}{k_{x1} - k_{x0}}$$

and their respective marginal utility coefficients (as defined above) will be

$$\frac{p_{x1} \cdot h_{x1} - p_{x0} \cdot h_{x0}}{p_{x1}(h_{x1} - h_{x1})} \quad \text{and} \quad \frac{p_{x1} \cdot k_{x1} - p_{x0} \cdot k_{x0}}{p_{x1}(k_{x1} - k_{x0})}$$

that is, $\left(h_{x1} - \frac{p_{x0}}{p_{x1}} \cdot h_{x0}\right) / (h_{x1} - h_{x0})$ and $\left(k_{x1} - \frac{p_{x0}}{p_{x1}} \cdot k_{x0}\right) / (k_{x1} - k_{x0})$.

The consumer with the higher coefficient is thus seen to put a higher valuation on marginal units of the commodity, X.[2]

The traditional theory of taxation favors progressivity on the ground that the (Marshallian) marginal utility of income falls steeply, or at least rapidly, as income rises. The basis of this tax prescription can be found adequately expressed in the following statement from Marshall's Principles.[3]

> In other words, the richer a man becomes the less is the marginal utility of money to him; every increase in his resources increases the price which he is willing to pay for any given benefit. And in the same way every diminution of his resources increases the marginal utility of money to him and diminishes the price that he is willing to pay for any benefit.

With the passing of hedonistic marginal utility, one of the traditional supports—indeed, the principal support— for progressive income taxation was considerably weakened. The principle of diminishing marginal utility of money and income received a severe body blow, and the case for progressive taxation lost respectability until Keynes came along and re-established it on a new basis, namely, the so-called psychological law of consumption, which linked income size inversely with the marginal propensity to consume. The validity of this psychological law of consumption, according to which the rate of marginal consumption out of additional income tends to fall off as income increases, has been established empirically for an entire

[2] Since marginal utility, as redefined, is closely related to the general shape of the demand curve, as was also its Marshallian prototype, it is fairly easy to see that it must in some way be connected with elasticity of the curve. Elasticity of demand was also redefined as the percentage change in expenditure in response to a given percentage change in price, i.e. $\triangle E.P/E.\triangle P$ or $\triangle E/Q.\triangle P$. Also, marginal utility (MU) and e_d are connected by the formula: $MU = e_d / (e_d + 1)$.

[3] Principles. III. iii. 3. Eighth Edition.

economy over time, as its income increases, and within a given short period in regard to its income distribution. Though not established for specific individuals, the "law" is believed to apply to most persons.

The case for progressive taxation was thus re-established, but no longer in terms of equalizing the marginal utility of expenditure for different individual incomes. The *rationale* was different : to increase the value of the marginal propensity to consume (or reduce the value of the marginal propensity to save) of high income groups, thereby raising the value of the marginal propensity to consume for society as a whole. What is taken by progressive taxation from the higher income groups is redistributed in the form of social services to the lower income groups mainly, these groups having a relatively higher marginal propensity to consume and lower marginal propensity to save than the higher income groups. Thus, progressive taxation becomes one of the means of maintaining the flow of social expenditures and the level of the national income.

There is, however, a parallel in the Keynesian analysis to the traditional equalization of marginal utility of incomes. It is more implicit rather than explicit. Although seldom carefully spelled out, the combination of progressive taxation and income redistribution through provision of social services implies a raising of the marginal propensity to consume of the higher income groups, and a lowering of that of the lower income groups towards some unspecified common value from which the divergence is considerably less than before. The only difference between the classical and the Keynesian type of equalization is that in the latter case the process of equalization goes on at the group (macroeconomic) not at the individual level.

Although empirically confirmed at the macroeconomic level, the psychological law of consumption is an inadequate basis upon which to found a theory of progressive taxation. For it is not known to what extent the "law" represents a behavior pattern that is governed by institutional factors and therefore subject to change with modifications in the economic environment. A theory of progressive taxation based on the psychological law is, at best, predicated upon the continuance of automatic saving out of large incomes as an established pattern of behavior . If the high income groups no longer saved automatically, but voluntarily increased their spending to the point where they had at least as high a marginal propensity to consume as the lower income groups—or a marginal propensity to consume that was not significantly different from that of the lower income groups—the entire case for progressive taxation would collapse.

Even without a change in the empirical basis of the psychological law of consumption the case for progressive taxation would

continue to rest uneasily at the level of the individual income earner.[4] For at the microeconomic level the main problems usually concern the allocation and use of resources. Consequently, any theory of income taxation, to be valid at this level, must have relevance to the problem of allocation. Yet in the absence of a measure or theory of interpersonal comparisons of the value of marginal units of resources, it would be difficult to establish a theory of income taxation relevant to the allocation problem. Unless we can measure and compare the marginal valuations of individual consumers on the basis of their potential spending power, or income, we cannot easily say whether or not the scarce resources of society are being properly allocated among alternative uses. The problem of efficient resource use, therefore, makes it necessary for economists to have a measure of interpersonal (or interfirm) comparison in the field of expenditure. Given such a measure, it becomes possible to say whether a certain individual or firm (or even a group of individuals or firms) has a tendency to over- or under-value the marginal use of resources, and to devise appropriate corrective measures. Only on such a basis can the theory of taxation become firmly established as an integral part of the theory of value.

The redefined index or coefficient of marginal utility provided above supplies the measure required for interpersonal comparisons. It can be empirically tested in investigating the pattern of expenditures of individual consumers, and in this manner may throw light upon the extent to which consumers do, or do not, in fact seek an equilibrium in their pattern of expenditures. To the extent that a tendency towards a balance of expenditures is revealed, this may be evidence that consumers do have fixed individual marginal valuations. If such a tendency was not revealed it would be in order to investigate the causes of the imbalance. In either case, the findings would be highly relevant to a theory of individual income taxation.

Since resource allocation hinges more directly on the spending, not on the earning, of individual income it would seem more logical to shift the basis of taxation from income to expenditure. Income as a basis can then only be justified on the ground of some presumed connection between size of income and marginal valuation in expenditure patterns. It is the place of theory to provide a general framework to serve as a guide to such investigations.

There are three possible assumptions which may be made and tested concerning the relationship between income size and the redefined concept of marginal utility (valuation) : first, that income size and marginal utility are inversely correlated ; second, that income

[4] See Blum, Walter J. & Harry Kalven, Jr., *The Uneasy case for Progressive Taxation*, (University of Chicago Press, 1953).

size and marginal utility are directly correlated; and, third, that marginal utility is the same for all incomes, or not significantly correlated with income size.

The only difference between the first and second assumptions is that on the first assumption the higher income earners, but on the second assumption the lower income earners, are the culprits in the misuse and waste of resources. And while a practical investigation would, undoubtedly, be both interesting and revealing, from a theoretical as well as from a policy point of view, it is immaterial which of the two assumptions is confirmed. For it follows quite logically from either assumption that, so long as the aim is to promote among consumers an equal or as near equal marginal valuation of resources as possible, the policy prescription would be the same; progressive taxation is indicated.

For reasons which cannot be gone into here in great detail[5] it may be said that the likelihood of a uniform marginal valuation coefficient for *all* consumers, regardless of income size, is not great. Experience, moreover, would seem to contradict such a possibility. Here again, however, empirical investigation is the answer. A finding which supports the third assumption, or its equivalent that there is no significant correlation between income size and marginal valuation, would not, indeed, destroy the case for *any* kind of income taxation; it would only destroy the case for progressive income taxation as an allocative mechanism aimed at equalizing the marginal valuations of consumers as much as is possible in the use of resources. More will follow later, on the implications of this assumption for a theory of income taxation.

At this point it may be helpful to summarize the argument and conclusions so far reached. This may be done in the following statements:

(1) Assuming that it is desirable for consumers to have equal final marginal valuation of resources in the interest of best allocation and fullest possible use, and that there is a direct relationship and systematic variation between size of income and final marginal valuation in consumer spending, then the variation is direct or inverse (including joint variation with regard to a third factor) or else nonexistent.

(2) If final marginal utility of any commodity at its current price is the same for all incomes, then there is no need to tamper with the income distribution. If the variation of marginal utility is directly or inversely related to size of income then the income distribution

[5] A fuller discussion of the implications of this assumption is provided in a forthcoming work by the author on the theory of consumer demand.

must be modified, in either case in the direction of greater equality; this being the condition of eliminating any disparity in final marginal valuation arising from differences in income.

(3) If taxation is to be employed as a means of equalizing net incomes then progressive taxation is indicated as appropriate for this purpose.

The first assumption regarding marginal utility and size of income has been favoured in traditional economic theory on the basis of the classical doctrine and interpretation of marginal utility. The prescription of progressive taxation indicated by the classical theory receives confirmation herein, both on account and in spite of the classical assumption regarding the connection between income size and (classical) marginal utility.

If either the first or the second assumption is valid it may well be the case that other factors than absolute size of income play a part in the relationship : such as, relative position in the income scale, asset holdings, previous peak income, and other factors that recent researches have brought into prominence.[6]

The implications of the third assumption are intriguing. If it should be found to have any validity at all, on the basis of empirical research, marginal utility, as defined and measured in this paper, would have no relevance for a theory of taxation, and taxation itself would have no validity as an allocative mechanism and would cease to be an integral part of value theory. It should still be possible, however, to make a case for income taxation (or expenditure taxation, for that matter) on other grounds : for example, the effect of the tax structure on the size and level of public revenue, on incentives, on consumption spending and investment, on saving, on the price level, etc. This would merely shift the case for income taxation back to the macroeconomic level.

Functional Taxation

It is therefore time to consider the case for taxation in a more general way from the point of view of the economic effects it is designed to achieve, as distinct from the ethical considerations which may be used to justify one form of taxation as against another. This is the concept of functional taxation, and is in line with Professor Abba Lerner's concept of functional finance[7] of which taxation is only one aspect. However, while Professor Lerner examines the

[6] See, e.g. Duesenberry, James S., *Income, Saving and the Theory of Consumer Behavior*, (Harvard University Press, 1952).

[7] See his *Economics of Control*, Ch. 24.

effects of income taxation on consumption, and regards this consumption-effect as the only justification for the use of the tax instrument, the view taken here is more inclusive in the sense that taxation in general has effects other than on conaumption spending. Furthermore, taxation is still an important, although from Professor Lerner's point of view unnecessary, instrument for raising public revenue.

It is well known that a progressive income tax is likely to fetch more revenue than any other type of tax levied on the same base. Therefore, if size of revenue is the main consideration this type of tax would have ample justification. Provided demand elasticities are taken into account, consumption and sales taxes, including import tariffs (all of which are generally and, it seems, unavoidably regressive in effect), may be employed to supplement income taxes for revenue purposes. A progressive tax structure, however, may discourage personal savings the steeper the graduation of rates and the more effectively it alters the income distribution in the direction of less inequality.

If the objective of taxation is to distrub the volume of private saving as well as the income distribution as little as possible, a tax proportional to income is indicated. This may be the reason why Adam Smith advocated this type of taxation as his first famous canon[8] although he was not averse to extra (though still proportional) levies on the rich.[9] The automatic saving of large incomes, however, may adversely affect the level of national income, as Keynes has taught us. Hence, without aiming at a uniform distribution of income as a goal, a moderate progressiveness in the income tax structure, with appropriate exemptions for lower incomes, supplemented by (regressive) consumption taxes, would seem to be indicated as a compromise between the three objectives of (a) obtaining a revenue, (b) maintaining the level of national income, with (c) the minimum possible disturbance of the income structure compatible with maintaining a steady flow of a part of that income into investment channels.

A flat-rate or poll tax, a species of regressive tax levied on the low income groups in some countries of the world, may serve to ensure a steady supply of labour from the low income groups for specific enterprises. Thus this type of tax has gained currency in countries of Asia and Africa where European colonial powers have held rule. It has received its economic justification on the ground of being, in the circumstances, the easiest and most practicable method of raising a revenue[10] as well as a means of providing labor for min-

[8] *Wealth of Nations*, Bk. IV, Ch. 2.

[9] *Idem*, Bk. V, Ch. 2, Pt. 2.

[10] See, for example, W. M. Macmillan, *Africa Emergent*, (Pelican Books A191 Revised and expanded edition, 1949), pp. 205-7.

ing and commercial enterprises operated by foreign capitalists. For obvious and understandable reasons connected with foreign political domination and the ethics of the situation, such taxes have generally been condemned both by the native populations and by foreign critics and observers. However, from the purely economic point of view the efficacy of this type of tax in achieving its desired objectives cannot be disputed. It would still work if levied on the native populations by their own rulers.[11] If, however, a tax should be justified by its economic results, this type of tax, levied in appropriate circumstances and by legitimate authorities, may be justified by its actual, if intended, results; provided that it is the most convenient and effective way to obtain a contribution from certain low income groups, and that there are no known or proven net adverse economic consequences also involved. It may also possess the advantage of leaving the individual free, within limits, to choose the kind of job he would like to work at, instead of being compelled to give direct labour on specified jobs, as under a feudal of regime.

It may be desired to foster individual saving within a limited range of income in a given community, both as an incentive to individuals to work for the higher rewards within this range of incomes, and as an additional source of investment capital. For this purpose a proportional tax on all incomes within the chosen range may be incorporated into a graduated income tax structure operating at either end of the range.

In addition to all the foregoing objectives any, and all, tax rates may be raised or lowered to regulate the amount of incomes left in the hands of consumers to spend (disposable income)—a process which may be integrated with counter-cyclical policy. This aspect of taxation has been adequately treated by Professor Lerner and others. Since, however, the height of the tax structure also affects the desire of individuals to work and to save, care is needed to ensure that an increase in tax rates designed to help curb an inflation does not also diminish the desire of individuals to work and to save. It is also important to guard against the use of this policy merely as a means of substituting government for individual saving—at the expense of the individual. For it is better that individuals be induced to put their savings into government bonds at little or no interest, where they can still call their principals their own, than that they be entirely deprived of them by making a compulsory transfer to the

[11] As in Ghana, the former Gold Coast, West Africa, even after it achieved independence; or in Nigeria where the locally elected regional governments continue the tradition of the poll tax, an indigenous tax which the British Government took over from the Moslem emirates of Northern Nigeria. The high rate of illiteracy among the west African population prevents widespread adoption of an improved system of income tax.

state through an increase in tax rates, for the same purpose of having the funds immobilized.

It becomes apparent, therefore, that depending on the economic (as distinct from ethical and other non-economic) objectives which a government aims to achieve in the allocation and use of resources, the various types of taxes—flat rate, proportional, regressive and progresseive—constitute a varied box of tools from among which to select the appropriate combination. Each combination would be judged in terms of its effectiveness in relation to the given objective, the ultimate realized effects and the uses to which the proceeds of the tax are put. Such economic considerations would seem to constitute the proper basis for decisions about fiscal instruments rather than the abstract canons of justice and fairness which, however laudable, are nevertheless controversial and outside the range of economics proper. If it be desired to take these extra-economic considerations into account, provided that agreement can be reached upon them, then all that the economist has to do is select and use his fiscal tools within the framework and limitations set by such considerations. It would then become clear that such extra-economic considerations form a part of the "givens" of the environment within which he has to work, and not a part of economic and fiscal policy.

The Shifting and Incidence of Income Taxes

The shifting and incidence of taxation is one of the most thoroughly discussed matters in economic theory. On the specific question of income taxes it is the general concensus that individual income taxes cannot be shifted.[13] This position is substantially correct.

An income tax affects the whole of a consumer's budget and his consumption expenditure, as well as the position of his price-expenditure curve on his income-expenditure locus. The effect is a parallel shift of his anticipated price-line downward to the left, as well as a similar shift of his price-expenditure locus and demand schedules. The shifts of the price-expenditure curve and demand schedules towards the origin, and along the income-expenditure locus pertinent to the anticipated price -line, are the resultant in each case of a pair of simultaneous leftward and downward movements. This double movement indicates that the consumer both reduces his demand and revises his marginal valuation schedule downward as a result of the tax deduction. Admittedly, not every single demand schedule may be so shifted by the consumer; the net result, however, will be a shift of schedules in the indicated direction. For even those schedules

[13] See Blum, Walter J. & Kalven, Harry, Jr., *op. cit.*, p. 29.

that are sticky will induce compensating movements in those that are less sticky. In this way the effect of the tax deduction on the consumer's income and expenditure is allowed for; the deduction itself constituting the difference between total and disposable personal income.

In any market situation, where his demand is only a small part of total demand for any commodity, the consumer cannot by this reduction in his income and expenditure affect the price of any commodity. Consequently the full effect must be borne by him in the form of a reduction in his total consumption. The effect is the same as though he had suffered a reduction in real income as a result of a simultaneous rise in the prices of all commodities.

From the point of view of a whole community, however, the effects of income (and company) taxation are different and complicated by three main considerations (1) the effect of consumer credit and loans, (2) the effect of indirect business taxes, and (3) the effect of government spending out of taxes and other sources of revenue. How these affect the results will be shown presently.

The analysis is conducted by the use of the aggregate supply and demand curves. Let us assume that personal and (company) income taxes on an entire community average, say, one-quarter of its national income. Then as a result of this levy the aggregate demand schedule for the national product would tend to shift leftward. This is because the reduction in consumer's money incomes would reduce their demand for real output and consequently the volume of purchases made. Assuming the absence of any other operative factors, the net result would be partly a reduction in the general level of prices and partly a reduction in total output. The precise extent of the price and quantity reductions will depend upon the relative elasticities of aggregate supply and aggregate demand. In any event, part of the tax would be borne by taxpayers as a whole through the reduction in real income and consumption, and part by producers through the reduction in volume of purchases, total revenue and profits.

The intervention of several other factors, however, tends to a modification of the expected results. First, the payment of taxes in equal instalments serves to slow down the recession of the demand schedule. Second, consumers may strive to maintain their previous consumption levels out of savings, credits and consumer loans. In this case the leftward shift of the aggregate demand schedule may be associated with an upward shift, resulting in increasing marginal expenditure in the lower range of the demand schedule; and a possible net increase in demand, output and prices, depending on the amount of consumer debt incurred.

Third, depending on whether there is a government budget surplus or deficit, the tax and other expenditures of government may check the leftward recession of the aggregate demand schedule, thereby preventing the full effects of the tax from being worked out. In fact with a government deficit the net result may actually be a shift of the aggregate demand schedule to the right—a complete reversal of movement—with an increase in output and prices.

Fourth, the aggregate supply curve itself is not likely to be stable. Indirect business taxes tend to raise the supply curve, contracting output and raising prices. Businesses may also shift the supply curve rightward through spending on expansion programmes.

The final price-output adjustment of the aggregate supply and demand schedules will therefore be the resultant of at least all these four factors taken together rather than singly, in conjunction with the relative elasticities of the schedules. Consequently, the effects of the original shift of the aggregate demand schedule as a result of taxation are submerged in the effects of consumer credit, government spending, indirect business taxes and business spending. We may therefore conclude that the incidence of income taxes on a community, taken as a whole, tends to be shared between taxpayers, on the one hand, and producers, on the other, in proportion to the relative elasticities of aggregate demand and supply; but other factors may modify this tendency.

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A THEORY FOR OPTIMUM TARIFF POLICY*

Synopsis

IN section 1 we describe the classical theory of optimum tariff and retaliation, under the two-country, two-commodity exchange model and point out the restrictive assumptions implied in the classical theory. In section 2, we present the classical two-country two-commodity model as a two-person non-zero-sum non-co-operative game between the policy makers of the two trading countries. The commercial policy-equilibrium point of the classical theory is shown to correspond to the non-co-operative equilibrium point of the game model. Sections 3, 4 & 5 are devoted to discuss how the game model can be used to study the strategic interdependence of the two trading countries, and also to obtain the optimum tariff policy-decisions under the situations when the restrictive assumptions of the classical theory are not valid. The last section viz. section 6 gives the conclusions of the arguments given in the earlier sections. In appendix A, we present the mathematical symbols and notations used and also the mathematical treatment of the game models. Appendix B gives diagrams used in the analysis.

1. *Classical Theory of Optimum Tariff and Retaliation*

Let us consider the classical two-country two-commodity exchange model. Country I exports commodity Y to country II and in exchange imports commodity X from it. Conversely, country II exports commodity X to country I and in exchange imports commodity Y from it. The classical theory of optimum tariff and retaliation[1] describes a process of "optimum" tariff imposition by one country followed by retaliation by the other country, which process may lead to a commercial policy equilibrium point at which no further retaliation is intended by the either country. The theory can be described by reference to a diagram (see diagram-1 in the Appendix A) as follows :

Suppose, the two countries are in the initial period at the free trade point; either country imposes zero tariffs on its imports. OI_0

*I am thankful to Dr. K. S. Rao for his guidance. My thanks are also due to Dr. K. S. Krishnaswamy, Reserve Bank of India, Bombay, for his encouragement and helpful suggestions in the preparation of this paper. I am, however, responsible for the remaining shortcomings.

[1] Tibor De Scitovsky—"A Reconsideration of the Theory of Tariffs"—*The Review of Economic Studies Vol. IX*, (Summer 1940), pp. 89-110; reproduced in *Readings in the Theory of International Trade*—American Economic Association Series—George Allen & Unwin Ltd. London—Third impression, pp. 358-589.

Also Harry Johnson—*International Trade & Economic Growth*—(George Allen & Unwin Ltd. 1958)—second chapter: Optimum Tariffs and Retaliation.

and OII_0 are the offer curves of the two countries corresponding to zero tariffs and they intersect at Po to give the free trade point on the trade plane (the plane OXY). U_I^o and U_{II}^o are shown as the community indifference curves passing through this point; these give the levels of welfare realised in the two countries by free trade. These are tangential to one another, for, when once the two countries are at the free-trade point, they cannot simultaneously improve their welfare positions by making adjustments in their trade policies. One of the policy makers of the two countries, who is more alert and prompt[2] is supposed to impose tariff first for improving the welfare level of his country. Let us suppose that the policy-maker of country-I (whom we call as planner-I) first starts erecting tariff barriers. Planner-I assumes that country-II's offer curve remains unchanged along OII_0, i.e., that planner-II does not make any change in his tariff policy and then chooses his tariff policy so as to bring the resulting trading point to a point at which the community indifference curve of country-I is tangential to the unchanged offer curve of country-II. The tariff-distorted offer curve of country I is shown as OI_1; P_1 is the corresponding trade point and U^1 is the corresponding indifference curve tangential to OII_0 at P_1. The tariff rate corresponding to OI_1 is the "optimum" one for country-I. To this, planner-II retaliates by imposing a tariff to bring the trade point to P_2 at which the community indifference curve of country-II is tangential to the tariff-distorted offer curve of country-I viz. OI_1. The tariff rate is "optimum" for country-II on the assumption that country-I's offer curve remains unchanged from OI_1. OII_1 is shown as the new tariff-distorted offer curve of country-II. This move of planner-II has resulted in a loss of welfare to country-I for, the community indifference curve of country-I through P_2 is towards the north-west direction from that passing through the point P_1. Now planner-I further retaliates by distorting his offer curve so that the trade point will be P_3 at which his community indifference curve is tangential to OII_1. This process of one planner retaliating by imposing an "optimum" tariff on the assumption that the other planner does not change his tariff policy, continues until the trade point becomes such that the indifference curve of the either country passing through it is tangential to the tariff-distorted offer curve of the other country. At such a point, each planner is not motivated to change his tariff policy when the tariff policy of the other planner is held unchanged. This point is called the commercial policy equilibrium point. The trade point P_2 shown in the diagram, as such, a commercial policy-equilibrium point.

The theory of optimum tariff and retaliation can also be described in terms of reaction-curve technique.[3] In diagram-2 (see

[2] Tibor De Scitovsky—*Ibid.*
Readings in the Theory of International Trade, p. 373.
[3] Harry G. Johnson, *ibid.*

the appendix-A), the abscissa refers to the tariff rate imposed by planner-I and the ordinate refers to the tariff rate imposed by planner-II. We call the corresponding plane (OZ_IZ_{II}) as tariff plane or the strategy plane. The curve $T_1T'_1$ shows the optimum tariff levels for planner-I corresponding to different tariff levels as imposed by the planner-II. Similarly is the curve $T_2T'_2$ for planner-II. If planner-I imposes the optimum tariff Oa on the assumption that planner-II's tariff is at Ob, then planner-II retaliates by imposing the optimum tariff given by Ob′; the planner-I will readjust to Oa′, and then planner-II to Ob″ and so on until commercial policy equilibrium is reached at the point C.

The process of optimum tariff and retaliation can be given both static and dynamic interpretations. In the dynamic interpretation it means that either planner retaliates to the other over a period of time, and the commercial policy equilibrium is reached after certain time-periods are elapsed. In the static interpretation however, it means that when once the policy-equilibrium point is reached, either planner is not motivated to change his tariff policy as long as the tariff policy of the other is unchanged. Thus it states the equilibrium property of the pair of tariffs corresponding to the policy equilibrium point.

It has been argued in the classical theory, that at every subsequent stage of the retaliatory process, the total volume of trade between the two countries and thus the level of total welfare of the two countries taken together dwindles and at the final commercial policy equilibrium point, the welfare levels in the two countries as compared with the levels in the initial situation of free trade may reflect any of the following three forms :[4]

(i) Country-I realises a welfare level which is less than the level under free trade, while country-II realises a welfare level which is larger than the level under free trade. This means that in the final position country-I loses while country-II gains.

(ii) Country-II realises a welfare level which is less than the level under free trade while country-I realises a welfare level which is larger than the level under free trade. This means that country-II loses while country-I gains by the retaliatory process.

(iii) Both countries realise welfare levels which are less than the respective levels under free trade. This means that both countries lose.

[4] See Harry Johnson : *ibid.* Refuting the contention of Tibor De Scitovsky that both countries necessarily lose as a result of the retaliation process, Harry Johnson has asserted that a country may gain while of course it is not possible that both will gain simultaneously.

It can be seen from the above arguments that the classical theory of optimum tariff and retaliation considers a situation characterised by the following two assumptions.

(a) For the purpose of adjusting their tariff policies, the two planners act without collaborating with each other and the process of non-collaborative retaliation continues until the commercial policy equilibrium point (when such one exists) is reached, and,

(b) Each planner, in retaliating by choosing his "optimum" policy assumes that the tariff policy of the other planner remains unaltered.

The main purpose of the sections below, is to analyse the problem of "optimum" tariff policy-making in the situations where any or both of the above assumptions are not valid.

2. *A non-Zero-Sum Game model for tariff-policy making*

Considering the classical two-country two-commodity exchange model, we can describe the process of optimum tariff and retaliation as a two-person non-zero-sum game. The two planners who make the policy choices are the two players of the game, with the respective pay-off functions and the strategy sets as defined below :

For planner-I, the pay-off function is the social-welfare function for country-I defined as a function of the imports and exports of the country and hence implicitly a function of the two tariff rates imposed by the two planners, (because the levels of imports and exports are determined by the two-offer curves which are functions of the two tariff rates).

The (pure) strategy-set for planner-I consists of the range of all possible levels of tariff rates which the planner-I consider as feasible for choice.

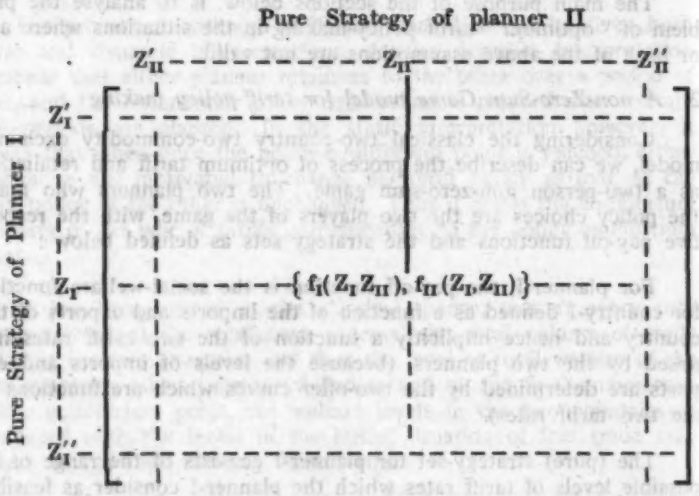
In symbols, we have denoted the pay off function for planner I by $f_I(Z_I, Z_{II})$ and the pure strategy by Z_I, and the pure strategy set by the range $Z_I' < Z_I < Z_I''$. (See Appendix A).

Again, the pay off function for planner-II is defined to be the social welfare function for country-II ; this is a function of the level of the imports and exports of country-II and hence of the two tariff rates as imposed by the two planners* The (pure) strategy set for planner-II consists of the range of all possible levels of tariff rates which the planner-II considers feasible for choice.

*In defining the pay-offs as done here, the assumption implicit is one of measurability of community utility in the two countries. Problems of measurability and transferability of utility are discussed in the literature on the Theory of Games.

In symbols, we have denoted the pay off function for planner II by $f_{II}(Z_I, Z_{II})$ and the pure strategy by Z_{II}, and the pure strategy set by the range $Z'_{II} \leq Z_{II} \leq Z''_{II}$.

The two-person game will be a non-zero-sum one for, the sum of the pay-offs to the two players corresponding to any pair of strategies chosen by them from their respective strategy sets (i.e. the sum of the welfare levels of the two countries corresponding to the pair of tariff rates as chosen by the two planners) is not zero. Thus the joint pay-off matrix for the two person non-zero-sum game model can be written in the following manner :



Let us suppose that the two players (the two planners) choose their pure strategies (i.e., the tariff rates) without mutual co-operation and that each player adjusts his strategy so as to maximise his pay off function on the assumption that the other player's strategy remains unaltered. The process of such non-co-operative mutual adjustments leads to a point (when such one exists) which is called the Nash non-co-operative equilibrium point, in the literature on Theory of Games. The equilibrium pair of strategies can be obtained by solving the following relations simultaneously:

$$\underset{Z_I}{\text{Maximise}} \quad f_I(Z_I, Z_{II}),$$

and

$$\underset{Z_{II}}{\text{Maximise}} \quad f_{II}(Z_I, Z_{II}).$$

Let (Z_I^{eq}, Z_{II}^{eq}) be the pair of equilibrium strategies. (Z_I^{eq}, Z_{II}^{eq}) is the Nash-non-co-operative equilibrium point.[5] It can be easily seen that the commercial policy equilibrium as described in the previous section corresponds to the Nash-non-co-operative equilibrium point of the game model described here.

3. *"Threat" tariff-policy and "Threat" surface*

The assumption that either planner considers while choosing his "optimum" tariff policy, the tariff policy of the other planner as unchanged obviously begs the question of rationality of behaviour of the two planners.[6] Let us suppose that the two planners act non-co-operatively but that either planner no longer assumes that the tariff policy of the other remains unaltered. Suppose also that country-II is to lose at the final equilibrium point. Knowing this the planner-II would do in the initial period itself all that he can, to see that the retaliatory process of tariffs is not set on. Since it is not possible for planner-II to come to conference table with planner-I to disuade him from setting on the retaliatory process, planner-II chooses a certain tariff policy in the initial period itself as a "threat" to impose "harm" on the welfare level of the country-I. The planner-II desires to do maximum possible "harm" to country-I and also desires at the same time to secure the welfare for his country at a certain level, which is higher than the level than can be realised at the equilibrium point. When planner-I knows this motivation of planner-II, then his "optimum" trade policy is the one which minimises the "harm" that the planner-II may impose upon him. Thus, the "optimum" tariff policy for planner-I and the desired "threat" tariff policy for planner-II are obtained by solving the following relations simultaneously:

$$\underset{Z_I}{\text{Maximise}} \quad \underset{Z_{II}}{\text{Minimise}} \quad \left\{ f_I (Z_I, Z_{II}) \right\}$$

Where $Z'_I \leqslant Z_I \leqslant Z''_I$ and $Z'_{II} \leqslant Z_{II} \leqslant Z''_{II}$

Subject to the condition $f_{II} (Z_I, Z_{II}) = f_{II}^{(0)}$.

Where $f_{II}^{(0)}$ is the welfare level that planner-II wants to realise for his country. The interpretation of this with respect to a diagram on

[5] This is equivalent to the Curnout equilibrium point of production rates (or price levels) in a duopoly problem. For a discussion of duopoly situation as a two-person game and the Curnout solution as a non-co-operative equilibrium point of the game etc. See Martin Shubik—*Strategy and Market Structure—Competition, Oligopoly, and the Theory of Games*, (New York, John Wiley & Sons Inc., 1959), Ch. IV.

[6] See Harry G. Johnson—*ibid.*
His foot-note No. 3 on page 32.

the trade plane (see the Appendix (A) diagram No. 3) can be given as follows:—

(i) The trade point lies on the community indifference curve described by the equation

$$G_{II}(X, Y) = f_{II}^{(0)}$$

(ii) The community indifference curve for country-I passing through this point is tangential to the tariff distorted offered curve of the country-II.

and (iii) Out of the several trade points satisfying conditions (i) and (ii) (points P, P_1, P_2.....) it is the one such trade point which has the smallest X-co-ordinate (shown as P in the diagram).

We can consider a different situation in which the roles of planner-I and planner-II are interchanged. Suppose country-I loses by retaliation and therefore planner-I chooses a "threat" policy against the planner-II who, knowing the motivation of planner-I wants to choose an "optimum" policy. The respective "threat" and the "optimum" policies can be obtained by solving the following relations simultaneously:

$$\underset{Z_{II}}{\text{Maximise}} \quad \underset{Z_I}{\text{Minimise}} \quad f_{II}(Z_I, Z_{II})$$

$$Z_I' < Z_I < Z_I'' \text{ and } Z_{II}' < Z_{II} < Z_{II}''$$

subject to the condition :

(i) $f_I(Z_I, Z_{II}) = f_I^{(0)}$.

Where $f_I^{(0)}$ is the welfare-level that the planner I wants to realise for his country. ($f_I^{(0)}$ is larger than the level that country-I obtains at the non-co-operative equilibrium point).

Again, interpretation of this result with respect to a diagram on the trade plane (see diagram 4 in the Appendix A) can be given as follows :

(i) The trade point lies on the community indifference curve, $e_{II}(X, Y) = f_I^{(0)}$.

(ii) The community indifference curve of country-II passing through this point is tangential to the tariff distorted offer curve of country-I passing through this point, and

(iii) Out of the several points satisfying the conditions (i) and (ii), (points P', P'_1, P'_2...) it is the one which has the smallest Y-co-ordinate. (Shown as the point P' in the diagram 4).

Now, suppose that both the countries are to lose at the non-co-operative equilibrium point. Suppose further that it is not possible for the two planners to come to conference table. In such a situation, either planner may be motivated to choose a tariff policy as "threat" to do maximum possible "harm" to the other planner. The pair of optimum "threat" tariff policies for the two planners is obtained by solving the following relations simultaneously :

$$\underset{Z_I}{\text{Maximise}}\ \underset{Z_{II}}{\text{Minimise}}\ \{f_I(Z_I, Z_{II}) - f_{II}(Z_I, Z_{II})\}$$

$$= \underset{Z_{II}}{\text{Minimise}}\ \underset{Z_I}{\text{Maximise}}\ \{f_I(Z_I, Z_{II}) - f_{II}(Z_I, Z_{II})\},$$

subject to the conditions,

$$Z_I' < Z_I < Z_I''$$

$$Z_{II}' < Z_{II} < Z_{II}''.$$

The interpretation of this with respect to a diagram in the trade plane can be done by defining a new family of community indifference curves for the two countries.

The new community indifference curve for country-I is defined as

$$G_I'(X, Y) = \{G_I(X, Y) - G_{II}(X, Y)\}$$

and that for country-II is defined as

$$G_{II}'(X, Y) = \{G_{II}(X, Y) - G_I(X, Y)\} = -G_I'(X, Y).$$

Now, the pair of optimum threat tariff policies is such that, the corresponding trade point is the non-co-operative equilibrium point with the following properties :

(i) The new community indifference curve of country-I through the trade point is tangential to the tariff distorted offer curve of country-I ; the new community indifference curve of country-II is tangential to the tariff-distorted offer curve of country-I and,

(ii) The X-co-ordinate of the trade point is the smallest possible and also the Y-co-ordinate of the trade point is the smallest possible.[7] (See diagram 5 in the Appendix).

[7] This second property may seem to give a trade point at the origin, i.e., elimination of all trade as the optimum "threat" of either planner. But this is not so. For, since we have supposed that the tariff levels of the two countries viz. z_I and z_{II} vary only between some finite limits, the trade point corresponding to the pair of "optimum threats" could be different from zero point on the trade plane.

When both the planners employ their optimum "threat" policies, the welfare levels of the two countries are obtained by substituting these tariff rates in the respective welfare functions. It may be noted that the pair of "optimum" threat tariff rates may not necessarily correspond to a situation of free trade.

Thus, when both the countries lose at the non-co-operative equilibrium point, then there is the possibility that the two planners may choose to employ their optimum "threat" tariff policies instead of voluntarily cooperating with one another (for we have assumed that such co-operation is not possible—may be due to certain political strictures or some temporary situations like war etc.). Thus, for such situations, it is not certain that the two countries maintain the free trade situation because they would both lose if the process of mutual retaliation is set on.[8] The two planners acting non-co-operatively may land themselves in an entirely new trade situation when they choose to employ their optimum "threat" tariff policies.

Now suppose that the welfare level of country-I is plotted along the abscissa and that of the country-II is plotted along the ordinate (we call the plane $Of_I f_{II}$ as the welfare plane or the pay-off plane —see diagram No. 6). A point in this plane refers to some trade point in the trade plane, and also corresponds to a point in the strategy plane defined earlier. The pairs of tariff rates obtained in the different situations considered in this section correspond to certain points in the pay off plane and it can be shown that all these points lie on a surface which is the locus of the points of the type:

$$\left\{ \underset{Z_I}{\text{Max}} \; \underset{Z_{II}}{\text{Min}} \; f_I(Z_I, Z_{II}),\ f_{II}(Z_I, Z_{II}) = f_{II}^{(0)} \right\}$$

We call this surface as the optimal "threat" surface of tariff rates.[9] Any point on this surface has the property that given the welfare level of one of the countries it gives the maximum possible "harm" that the welfare level of the other can be subjected to.

4. *Trade Agreements with provision for unilateral income transfers*

Let us now consider situations when the two planners mutually collaborate in choosing their tariff policies. We assume that the two planners are "rational" in their negotiations.[10] They agree to choose a pair of tariff policies in such a way that the welfare levels

[8] Compare the following statement from Harry G. Johnson, *ibid.*, pp. 55. ".... If it were true that each individual country lost under tariff retaliation, a return to free trade by itself would suffice to make each country better off and all would have an incentive *to come to an agreement to enforce it.*" (italics ours). We have been considering here what happens when there is no possibility of mutual collaboration.

[9] For discussion of a similar threat surface and threat strategies in the analysis of a duopoly problem, see Martin Shubik—*ibid.*, pp. 71-74.

corresponding to this pair, leave no scope for further simultaneous improvement by making adjustment in their policies. This means that the pair of tariff rates agreed upon must be such that the welfare point corresponding to these tariff rates, plotted on the welfare plane lies on the pareto optimal surface defined as the locus of the points of the type :

$$\left\{ \underset{Z_I}{\text{Max}} \; \underset{Z_{II}}{\text{Max}} \; f_I(Z_I, Z_{II}), \quad f_{II} = f_{II}^0 \right\}$$

$$\text{Subject to } Z_I' < Z_I < Z_I''$$

$$Z_{II}' < Z_{II} < Z_{II}''.$$

Any point of the pareto optimal surface has the property that it gives for a given level of welfare of one country, the maximum possible welfare that the other country can realise. The process of trade agreements consists of bargaining between the two planners to choose a point on the pareto optimal surface. Let us suppose that the two planners agree to resort to unilateral income transfers as side payments for settling their bargaining in a mutually amicable manner. We shall consider the problem as a Nash two-person co-operative game with side payments.[11] The two planners agree to choose their tariff polies so as to maximise the joint welfare level ; in other words they agree to choose a pair of tariff—rates which maximises the total volume of international trade. This will be so when each chooses zero tariff policy, i.e., when it is a situation of free trade. The corresponding pair of welfare levels refers to a point on the pareto optimal surface in the pay off plane. Let this point be $(\bar{f}_I, \bar{f}_{II})$. The two planners bargain for a division of the joint maximum welfare viz. $(\bar{f}_I + \bar{f}_{II})$ between themselves. Nash criteria of division provide a method of division of the joint maximum which may be appraised as " fair " for the two " rational " bargainers and also these criteria take into account the strategic role played by the " threats " in the process of negotiations. The optimal pair of threat tariff-policies is obtained by solving :

$$\underset{Z_{II}}{\text{Min}} \; \underset{Z_I}{\text{Max}} \; \{f_I - f_{II}\} = \underset{Z_I}{\text{Max}} \; \underset{Z_{II}}{\text{Min}} \{f_I - f_{II}\}$$

$$\text{Subject to } Z_I' < Z_I < Z_I''$$

$$\text{and } Z_{II}' < Z_{II} < Z_{II}''.$$

[10] The word "rational" is used only in this sense : Given the desires as known, the actions are always consistent with them. The planners desire to obtain maximum possible welfare levels for their countries and their negotiations will be consistent with these desires.

[11] A brief description of the characteristics of the Nash—co-operative game and its solution is given in the Appendix-A. For detailed discussion see J. F. Nash—" Two-persons Co-operative Game " *Econometrica* 21, (1953), pp. 128-140 and J. F. Nash—" The Bargaining Problem " *Econometrica* 18, (1950), pp. 155-162 and also see M. Shubik, *ibid.*

Let this pair be (Z_I^T, Z_{II}^T). The corresponding pair of welfares is a point on the threat surface in the pay-off plane. This point is defined as the status-quo point for further bargaining. The Nash solution is obtained by the point of intersection of the 45° line through the "threat" point to the surface (a straight line) whose equation on the pay-off plane is

$$f_I + f_{II} = \bar{f}_I + \bar{f}_{II}$$

(see diagram 7 in the appendix).

Let the Nash solution give (f_I^S, f_{II}^S) as the pair of welfare levels for the two countries. Then the unilateral income transfers needed to settle the bargaining are given by

$$(f_I^S - \bar{f}_I) = -(f_{II}^S - \bar{f}_{II})$$

The positive of the two quantities $(f_I^S - \bar{f}_I)$, $(f_{II}^S - \bar{f}_{II})$ refers to the country which receives the side payment and also gives the amount of the side payment made by the other country.

The above analysis of the trade agreement in the frame work of Nash co-operative game theory establishes that the extent of income transfer[13] that a country can claim for agreeing to maintain the free trade situation, depends upon the relative "threat" position of that country and not on the fact that the country is going to gain at the ultimate non-co-operative equilibrium point if the process of optimum tariff and retaliation is set on.[13] The country which may be losing at this point, may be capable of better "threat" so that it may eventually receive side payment instead of itself making one to the other.

5. *Trade Agreements without provision for unilateral income transfers*

We may also consider a situation when the two planners collaborate for choosing their tariff policies but do not resort to unilateral income transfers to settle their negotiations. We can consider this situation as a problem in the Nash co-operative game without sidepayments. The pair of "optimal" threats, and the "fair" solution of welfare levels and the corresponding pair of tariff policies can be obtained on the lines of the Nash criteria of obtaining solution for co-operative games without side payments. According to

[12] Compare the following statement from Harry G. Johnson, *idib.*, p. 55. "..... But if, as the foregoing analysis shows is possible, not all countries lost under tariff-retaliation, a return to free trade by itself would not suffice to make each country better off, and an agreement to restore and maintain free trade would have to provide incentives to participate, in the form of income transfers from the others, *to the countries which gained under tariff retaliation.*" (italics ours).

[13] The pay-off transfer obtained in the Nash-Co-operative game is not the same as the income transfer between the two countries. The appropriate extent of income transfer can be obtained after making adjustment for the differences in the marginal utilities of incomes in the two countries.

Nash criteria, the trade agreement would in this case result in a situation other than the free trade. For, the two planners do not jointly maximise their welfare levels but however adjust their tariff policies to correspond to some point other than the joint maximum along the pareto optimal surface in the pay off plane. (See the diagram—8 in the appendix).

6. *Concluding Remarks*

In conclusion, the following points may be mentioned as the main results of the arguments of the previous sections :

(i) The commercial policy equilibrium point described in the classical theory of optimum tariff and retaliation, is the non-co-operative equilibrium point in the two-person non-zero-sum game between the two planners, with their tariff policies as pure strategies and the welfare functions as the pay off functions.

(ii) The classical theory assumes that one planner while choosing his own optimum policy considers the other planner's policy as remaining unaltered; this begs the question of rationality of behaviour. When this assumption is dropped, optimum tariff policy has to be differently defined. When one planner chooses his "threat" policy, the other planner has to choose an "optimum" policy to safeguard his country's welfare from the worst to the maximum possible extent. There is also the possibility that the two planners acting non-co-operatively may choose their optimal "threat" policies simultaneously. The possibility of such a situation shows that even though the two countries lose at the non-co-operative equilibrium point, they may not revert to the free trade situation but land in a different trade situation determined by the optimal pair of "threat" policies; of course, if the two planners come to the conference table for collaboration, they *may* decide to have free trade situation, which *may not* be the case when they act non-co-operatively.

(iii) When the two planners collaborate for choosing their tariff policies with provision for unilateral income transfers, they may choose the free trade situation. The extent and also the recipient of the sidepayment are determined by considering the relative "threat" positions and not by the fact that one country is going to lose at the non- co-operative equilibrium point. Nash theory of co-operative games with sidepayments can be used to determine the recipient of the sidepayment and also the extent of sidepayments on the principles of "fairness."

(iv) When the two planners collaborate without provision for side payments then they may choose a trade situation different from the free trade situation. Nash theory of co-operative games without sidepayments can be used for finding a "fair" settlement of the bargaining in such situations.

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University of Bombay.

APPENDIX A

The two countries are denoted as country-I and country-II, and the respective planners are denoted as planner-I and planner-II. The suffix I added to a symbol refers to the meaning of the symbol for country-I (or for planner-I), and the suffix II added to a symbol refers to the meaning of the symbol for the country-II (or for planner-II). The superscript T to the upper right corner of a symbol refers to the "threat" policy of the planner; the superscript S written to the upper right hand corner of a symbol refers to the situation mutually agreed upon by the two planners who are co-operating with provision for sidepayments after the sidepayments have been made, and a bar put on the symbol refers to the situation before the sidepayments have been made. The superscript NS (No side payment) written to the upper right hand corner of a symbol refers to a situation mutually agreed upon by the two planners who are co-operating without provision for side payments.

X denotes the commodity exported by country-II and Y denotes the commodity exported by country-I. X & Y are also used to refer to the volume of goods traded between the two countries.

Z_I: Tariff-rate imposed by planner-I on the imports of his country.

Z_{II}: Tariff-rate imposed by planner-II on the imports of his country.

Z_I and Z_{II} constitute the pure strategies of the planners I and II respectively, and the respective strategy sets are defined as:

For Z_I, $\quad Z_I' \leqslant Z_I \leqslant Z_I''$

where Z_I' and Z_I'' are finite,

and for Z_{II}, $\quad Z_{II}' \leqslant Z_{II} \leqslant Z_{II}''$

where Z_{II}' and Z_{II}'' are finite.

The family of community indifference curves or the iso-welfare curves for country-I mapped on the trade plane is defined as follows:

(1) $U_I = G_I(X, Y)$ where $G_I(X, Y)$ is a function of X and Y, giving the level of welfare of country-I for a given pattern of the exports and imports.

Similarly, the family of community indifference curves or the iso-welfare curves for country-II mapped on the trade plane is defined as follows:

(2) $U_{II} = G_{II}(X, Y)$, where $G_{II}(X, Y)$ is a function of X and Y, giving the level of welfare of country-II for a given pattern of its exports and imports.

The offer curve (also called the transformation curve or the reciprocal demand curve) for country-I is defined as follows:

(3) $g_I (X, Y, Z_I, Z_{II}) = 0.$

The offer curve for country-II is defined as follows :

(4) $g_{II} (X, Y, Z_I, Z_{II}) = 0.$

The trade point is defined as the point of intersection of the curves (3) and (4). The (X, Y) co-ordinates of a trade point can be obtained by solving (3) and (4) simultaneously, Thus,

$$\left.\begin{array}{l} \text{Let } X = h (Z_I, Z_{II}) \\ Y = h' (Z_I, Z_{II}) \end{array}\right\} \text{ denote the trade point.}$$

By substituting these values in the function

$U_I = G_I (X, Y)$ we obtain the welfare-level enjoyed by country-I at this trade point. We rewrite the function $G_I (X, Y)$ as a function of Z_I and Z_{II}, thus,

(5) $U_I = f_I (Z_I, Z_{II})$ is defined as the pay off function for planner I, and it gives the pay off to him when Z_I is the strategy chosen by him and Z_{II} that chosen by planner II.

Similarly, by substituting the co-ordinates of the trade point in the function $U_{II} = G_{II} (X, Y)$, we obtain the welfare level enjoyed by country II at that trade point. Again rewriting $G_{II} (X, Y)$ as a function of Z_I and Z_{II}, we obtain,

(6) $U_{II} = f_{II} (Z_I, Z_{II})$, and $f_{II} (Z_I, Z_{II})$ is defined as the pay off function for planner II. $f_{II} (Z_I, Z_{II})$ gives the pay off to planner II, when Z_I is the strategy chosen by planner I and Z_{II} that chosen by himself.

The condtion that a point lies on the "threat surface" can be obtained as follows :

Since we have

$$\underset{Z_I}{\text{Max}} \; \underset{Z_{II}}{\text{Min}} \; f_I (Z_I, Z_{II})$$

subject to the condition $f_{II} = f_{II}^{(0)}$

therefore,

$$\frac{\partial f_I}{\partial Z_I} dZ_I + \frac{\partial f_I}{\partial Z_{II}} dZ_{II} = 0$$

and $$\frac{\partial f_{II}}{\partial Z_I} dZ_I + \frac{\partial f_{II}}{\partial Z_{II}} dZ_{II} = 0.$$

Eliminating dZ_I and dZ_{II}, we obtain the required condition as :

$$(7) \quad \begin{vmatrix} \frac{\partial f_I}{\partial Z_I} & \frac{\partial f_I}{\partial Z_{II}} \\ \frac{\partial f_{II}}{\partial Z_I} & \frac{\partial f_{II}}{\partial Z_{II}} \end{vmatrix} = 0$$

We may plot (Z_I, Z_{II}) (in the strategy plane), satisfying the above condition, or plot the points (f_I, f_{II}) corresponding to the (Z_I, Z_{II}) satisfying the above condition. In the former case we obtain a surface of threat strategies and in the latter, a surface of pay offs corresponding to the threat strategies. We consider only that part of the threat surfaces which correspond to the strategy sets defined by:

$$Z_I' \leq Z_I \leq Z_I''$$
$$Z_{II}' \leq Z_{II} \leq Z_{II}''$$

The pareto optimal surface is obtained by considering the locus of the points :

$$\underset{Z_I}{\text{Max}} \quad \underset{Z_{II}}{\text{Max}} \quad f_I (Z_I, Z_{II})$$

Subject to $Z_I' \leq Z_I \leq Z_I''$

and $Z_{II}' \leq Z_{II} \leq Z_{II}''$

and $f_{II} = f_{II}^{(0)}$.

Thus the condition for any point to lie on the pareto optimal surface is :

$$(8) \quad \begin{vmatrix} \frac{\partial f_I}{\partial Z_I} & \frac{\partial f_I}{\partial Z_{II}} \\ \frac{\partial f_{II}}{\partial Z_I} & \frac{\partial f_{II}}{\partial Z_{II}} \end{vmatrix} = 0$$

Again, the pareto optimal surface may be mapped on the strategy plane or on the pay off plane. The conditions (7) and (8) are identical ; this means that the same surface has two branches —one branch representing the threat surface and the other representing the pareto optimal surface.

Nash Co-operative Game with Sidepayments

Salient characteristics of the Nash theory of co-operative games with sidepayments can be briefly stated as follows :

(a) The two players agree to choose their strategies so as to maximise the joint pay-off function (sum of the two pay-off functions).

(b) The final pay-off positions of the two players are the outcomes of their bargaining for the division of the joint maximum between themselves. In the process of bargaining, the two players employ their optimal threat strategies, and the pair of optimal threats determines the status-quo point for future bargaining.

(c) The alternative possibilities of division of the joint maximum are represented as points on the pay off plane; these points lie on a straight line. The Nash-solution of bargaining picks up a point on this line such that the product of its co-ordinates as measured from the status-quo point (the pair of "threat" pay-offs) as the origin is the maximum of all such products.

(d) The recipient and the extent of the sidepayments are determined by considering the solution of the bargaining, and the pair of pay-offs corresponding to the strategies chosen by the two players.

Nash has shown that the bargaining solution as suggested by him possesses certain desirable properties which any two rational bargainers would desire to realise for arriving at an agreement and that it is a unique solution with these properties.[13]

Nash Co-operative Game without Sidepayments

The characteristic features of the Nash theory of co-operative games without sidepayments can be briefly stated as follows :

(a) The two players do not now choose their strategies so as to jointly maximise their pay-offs, but however adjust their strategies so as to correspond to some mutually agreed point on the pareto optimal surface on the pay-off plane.

(b) Again, a pair of optimal threats is employed and this determines the status-quo point for further bargaining. It should be noted that the optimal threats under no sidepayment case are different from those employed under the sidepayment case.

(c) The status-quo point (the optimal threat point) and the no-sidepayment solution point are characterised by the following properties :

(i) The line joining the status-quo point and no-side-payment solution point has a slope which is the negative of the slope of the tangent to the pareto optimal surface at the solution point.

[13] For a detailed discussion, see J. F. Nash (Jr.). "Two person co-operative Game" *Econometrica* 21 (1953), pp. 128-140. For a critical appraisal of Nash criteria see Howard Raiffa and Duncan Luce—*Games and Decisions* (John Wiley & Sons, Inc., New York 1957), pp. 124-142.

(ii) The pay-off curves obtained by holding one player's strategy at his threat strategy, while the strategy of the other is varied, are tangential to one another at the threat point and the line joining the threat point (status quo point) to the solution point is this common tangent.[14]

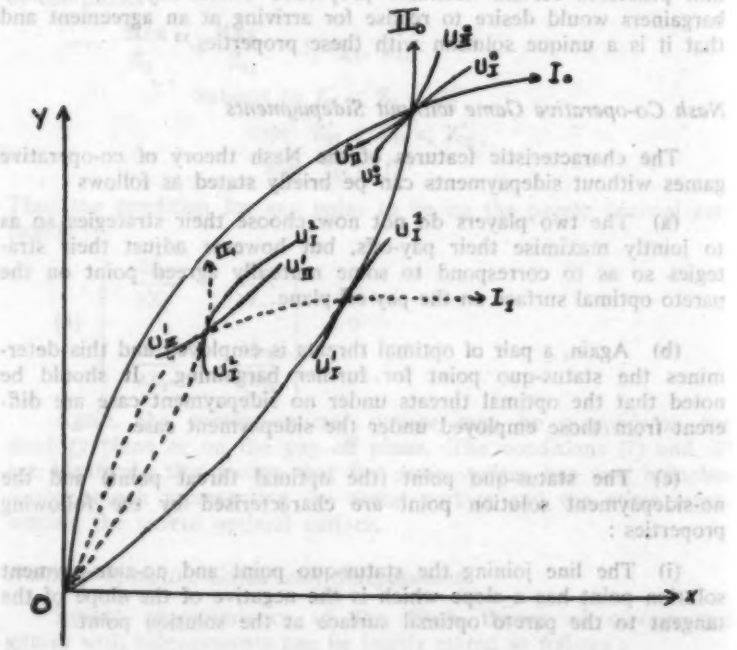
Again, Nash has shown that the solution under this case also satisfies the same desirable properties as before.

APPENDIX B

Diagrams :

Diagram—1. Classical theory of optimum tariff and retaliation. Offer curve method.

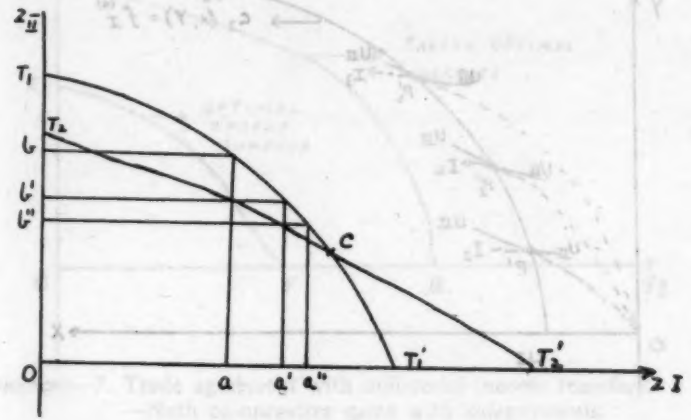
Trade Plane



[14] For detailed mathematical treatment of obtaining the threat point and the solution point under the no-sidepayment situation, see Martin Shubik—*Ibid.*, especially Appendix C, pp. 360-631.

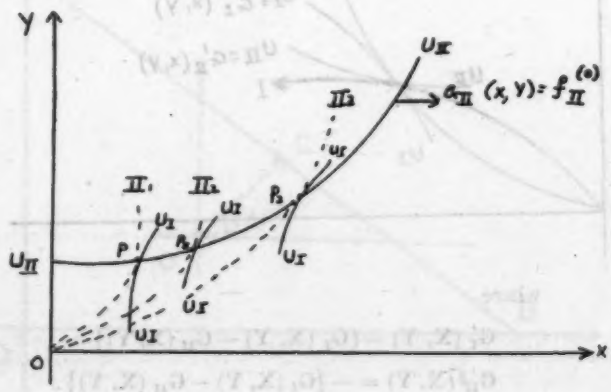
Diagram—2. Classical theory of optimum tariff and retaliation. —Reaction curve method.

Strategy Plane



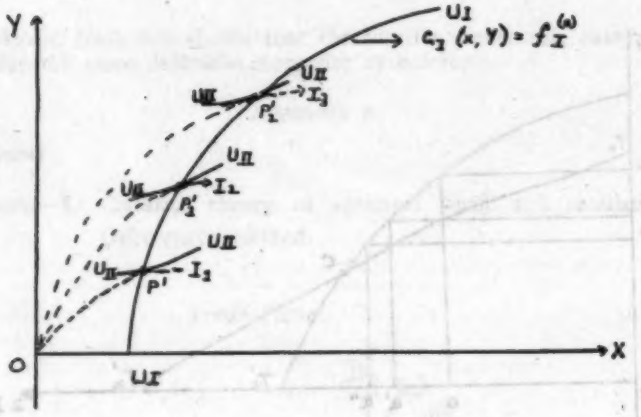
Diagram—3. "Threat" tariff policy for planner-II and "Optimum" tariff policy for planner-I.

Trade Plane



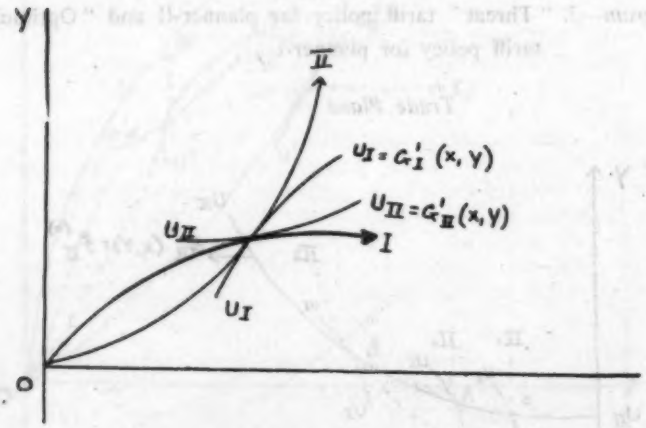
Diagram—4. "Threat" tariff policy for planner-I and "optimum" tariff policy for planner-II.

Trade Plane



Diagram—5. Pair of optimum "threat" policies of the two planners.

Trade Plane



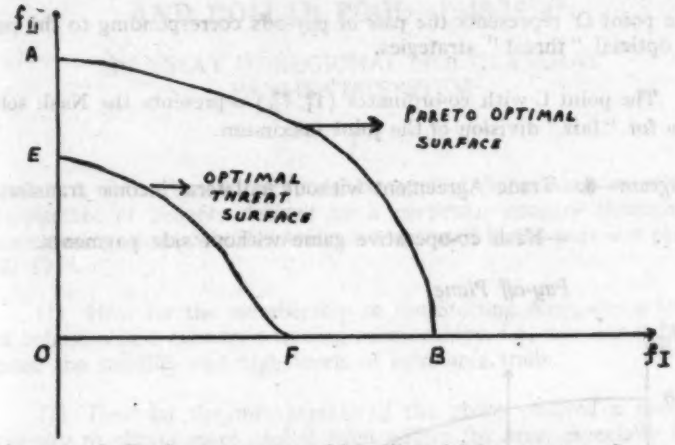
where

$$G_I'(X, Y) = \{G_I(X, Y) - G_{II}(X, Y)\}$$

$$G_{II}'(X, Y) = -\{G_I(X, Y) - G_{II}(X, Y)\}.$$

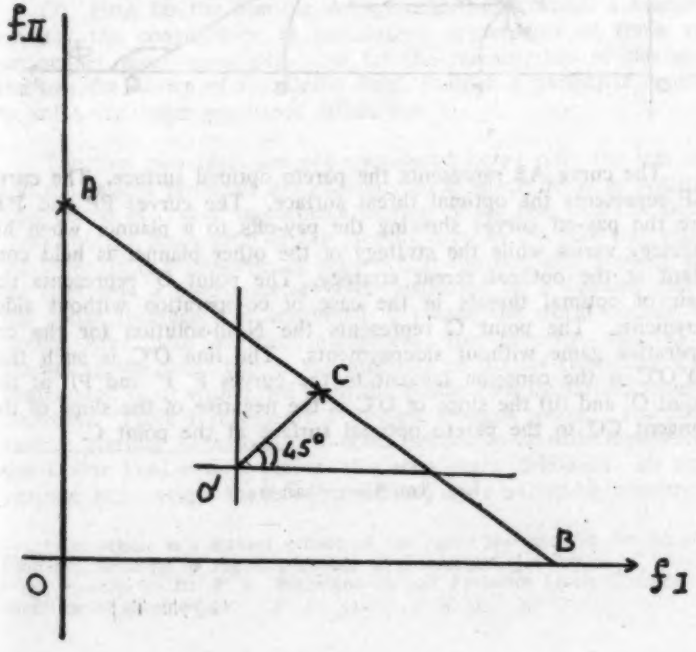
Diagram—6. Optimal "threat" surface and the pareto optimal surface.

Pay-off plane:



Diagram—7. Trade agreement with unilaterial income transfers. —Nash co-operative game with sidepayments.

Pay-off Plane



Equation for the line AB

$$f_I + f_{II} = \bar{f}_I + \bar{f}_{II}.$$

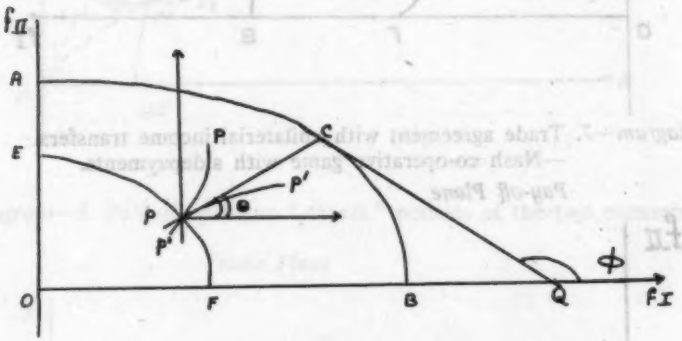
The point O′ represents the pair of pay-offs corresponding to the pair of optimal "threat" strategies.

The point C with co-ordinates (f_I^s, f_{II}^s) represents the Nash solution for "fair" division of the joint maximum.

Diagram—8. Trade Agreement without unilateral income transfers.

—Nash co-operative game without side payments.

Pay-off Plane



The curve AB represents the pareto optimal surface. The curve EF represents the optimal threat surface. The curves PP and P′P′ are the pay-off curves showing the pay-offs to a planner when his strategy varies while the strategy of the other planner is held constant at the optimal threat strategy. The point O′ represents the pair of optimal threats in the case of co-operation without side-payments. The point C represents the Nash-solution for the co-operative game without sidepayments. The line O′C is such that (i) O′C is the common tangent to the curves P′ P′ and PP at the point O′ and (ii) the slope of O′C is the negative of the slope of the tangent CQ to the pareto optimal surface at the point C.

$$\text{i.e., } \tan\theta = -\tan\phi.$$

WORKING OF THE STERLING AREA GOLD AND DOLLAR POOL—1948-1958*

AN ESSAY IN REGIONAL MULTILATERAL PAYMENTS SYSTEM

I

USUALLY, three broad tests can be applied in making an overall assessment of benefits derived by a particular country through its membership of the Sterling Area as it operated in the post-war period till 1958.

(1) How far the membership of the Sterling Area was a factor of cohesion in a country's trading relationships, *i.e.*, how far it facilitated the stability and high levels of intra-area trade.

(2) How far the membership of the group enabled a member country to obtain more capital from within the area, especially from the United Kingdom than would have been the case if that particular country were not the member of the group and

(3) How far the Sterling Area mechanism afforded a member-country the convenience of multilateral settlements of trade and payments; more especially, how far the membership of the area, through the device of the Dollar Pool, enabled a particular country to solve its dollar payments difficulties.

The first two tests are not considered here; only the last test and the related problems are examined in as much detail as possible. This test is of crucial importance in view of the fact that the Dollar Pool was the main prop of the sterling area in the post-war period till 1958. It is reasonable to believe that the post-war sterling area till then was a discriminatory bloc instituted as a defence against the dollar shortage that continued to plague the world outside the Dollar Area with varying intensities. The criterion adopted in examining the third test is the amounts of dollars (including gold) contributed to or withdrawn from the Dollar Pool by various member countries. Table I represents a modest attempt towards estimating various Sterling Area countries' contributions to or withdrawals from the Dollar Pool over a period of eleven years 1948-1958. Its main purpose is to assess the benefits derived by a particular country or

*The article is a revised version of the paper presented in the Research Students' Seminar of the Department of Economics, University of Bombay. I am thankful to Dr. P. R. Brahmananda and Professor Lester Chandler for their useful comments.

the rest of the group through the membership of individual country concerned. The minus sign under the column year and country row would indicate the amount of dollars obtained by the country concerned from the rest of the group i.e. the benefits derived by the country from the rest of the group through its membership. In the opposite case, the plus sign would indicate the amount of dollars obtained by the rest of the group from the country concerned i.e. the benefits derived by the rest of the group through the membership of the country concerned.

In order to make the empirical study of the problem more meaningful, section II elucidates the basic concept of the Dollar Pool and explains its modus operandi and rationale of its existence in the post-war period. And section III, in light of this discussion, looks into the actual working of the Dollar Pool with a view to examine the third test mentioned above.

II

Concept

The Dollar Pool can be described as the common fund of dollar resources to which the dollar surplus countries of the Sterling Area contributed their excess dollar earnings and from which the dollar deficit countries obtained dollars to meet their dollar deficits. Since the Sterling Area was a combination of the dollar surplus and dollar deficit countries, it was profitable to institute a joint pool of dollar resources through the mechanism of which excess dollar earnings of the dollar surplus countries can be transferred to the dollar deficit countries with three-fold objective of helping the dollar deficit countries, avoiding the idle holdings of dollars on the part of the dollar surplus countries and ensuring the most efficient use of limited dollar resources from the point of view of the group as a whole. Since the Sterling Area countries were endowed initially with varying amounts of sterling balances to their credit with the United Kingdom, sales and purchase of dollars against sterling, through the device of the Dollar Pool, did not present any inconvenience, the only major problem for the administering authority of the Bank of England was to preserve the dollar solvency of the whole of the Sterling Area without reducing the resources of the Dollar Pool to 'unsafe' levels and without being 'unfair' to any family member in assisting in its dollar payments difficulties. At a point of time the Dollar Pool represented the past savings of dollars invested in the pool. The current dollar export earnings of the area as a whole and loans and credit obtained from the dollar area and in dollars from elsewhere were the two major sources of dollar finance. Any excess of receipts from these two sources over the payments of the Area as a whole was the net savings in dollars that was invested in the Dollar Pool.

In the opposite case, excess of gross payments over gross receipts of the Area as a whole represented disinvestment in the Dollar Pool.

The concept and the mechanics of the Dollar Pool were not new to the member countries of the Sterling Area. During the 1930's and even before that, net dollar earnings and earnings of any other non-sterling currency were sold in London for sterling or these currencies were bought for sterling from London.[1] The important change that took place with the coming of the war in 1939 was not that dollars and other 'hard' currencies were pooled, but that the drawings from the pool became restrictive and contributions to the pool obligatory for the member countries with a two-fold objective of efficient mobilisation of resources for winning the war and productive utilisation of limited dollar resources to meet the peace-time requirements of reconstruction and development.

Modus operandi of the Pool

The question of the operation of the Pool was important in view of the fact that the dollar resources of the Dollar Pool were limited in relation to high propensities of various member countries to spend on dollar goods and that the dollar export earnings and the amounts of dollar loans and credit that can be mobilised were subject to uncertain forces. The specific question is : What were the principles upon which the limited dollar resources were rationed out and allocated among the member countries ? In other words, what were the principles upon which the dollar import policies of the member countries were determined ? It should be admitted that the working of the Dollar Pool was haphazard in the sense that there were no clear-cut rules and regulations laid down that would govern the dollar allocations and dollar import programmes of the member countries. Inspite of this, no undue strain was exercised by the countries (taken together) on the Dollar Pool, in any deficit year.

The best that can be done here is to generalize from the experience of the post-war working of the Dollar Pool. Two or three things seem quite obvious.

[1] Since, before the war, all currencies were convertible in the sense that the Bank of England was able and willing to buy and sell any non-sterling currency for sterling, the pool can be called the reserves of convertible currencies. During and after the war, dollar was truly 'hard' currency, the demand for which far exceeded the supply and became the only fully convertible currency. Therefore, till 1958, the pool was known as the Dollar Pool. With the establishment of non-resident convertibility by the end of 1958, the Dollar Pool has ceased to be merely the Dollar Pool and now has become the pool of gold and convertible currencies. But the basic mechanism of the pool is unaltered from the point of view of a member country in particular and the Sterling Area in general ; the main problem is to have 'adequate amounts' of external currencies rather than dollars only.

(1) Method of making specific dollar allocations to various countries was avoided as far as possible (An exception to this is to be found in agreements with Iraq and Egypt between 1945 and 1947 and with India, Ceylon, Pakistan, and Burma between 1947 and 1949 whereby these countries were allowed to draw upon the pool only up to certain agreed limits). Difficulties involved in such rigid method were obvious to each member country and to the administering authority of the Bank of England. First, it would have been difficult for each country to estimate its dollar requirements for a particular year or period, so also to know in advance its gross dollar earnings. The problem of dollar budgeting would have been difficult indeed. Secondly, each member country, to be on safe-side, would have over-estimated its requirements, if only in the fear that in the process of negotiations, dollars made available to it would be reduced. And thirdly, a country after having been granted a definite sum, would like to spend the whole of amount available to it, if only in the fear that if it underspends, its dollar allocations in the next period would be whittled down.

(2) As an alternative to any such rigid methods the broad principles adopted appear to be something like this. Each member country was expected to maximize its gross dollar earnings and minimize its gross dollar payments. That is to say that each country was asked to frame its dollar import programme in such a way that only the 'relatively essential' goods not obtainable from elsewhere in the non-dollar area were to be imported from the dollar area (an exception to this was the agreement at the 1949 Commonwealth Finance Ministers' Conference that each member country would reduce its dollar imports by twenty-five per cent of their level in 1948). Only the excess of dollar payments involved in importing essential goods over gross dollar earnings was made available to the particular country; in the opposite case, excess of earnings over payments was contributed to the Dollar Pool. In any case, both the dollar surplus and dollar deficit countries were asked to maximise their gross dollar earnings and minimize gross dollar payments. Member countries undertook to import only those dollar goods which were roughly as essential to their economies as those imported by other members were to theirs. This can be expressed in a formula as follows.

(1) $emA = emB = emC = emI = emN$

em= stands for essential imports and A, B, C, I, N stand for various countries that import essential goods. The formula means that the degree of essentiality satisfied by each of the countries A, B, C, I and N would be the same though the composition of essential commodities imported would be different for each of the countries (depending upon requirements of their productive structures and availability of substitutes from soft currency area). It should be

noted that in the above formula, there is no equalization of monetary (dollar) values paid for essential goods imported by various countries. That is to say that the amount of dollar payments involved in importing essential goods by A may be, say, more than that involved in importing essential goods by B and less then that involved in imimporting essential goods by C. There is no equalization of dollar expenditures, rather there is the equalization of the degree of essentiality satisfied by each of the countries irrespective of money values.

The second formula that got to be satisfied would be as follows :

(2) $emA + emB + emC + emI + emN = X + C + (T_R - S_R)$

The left hand side of the formula represents gross dollar expenditures of the whole of the group. The right hand side of the formula represents gross dollar receipts composed of dollar export earnings (X), amounts of loans and credits obtained (C) and the utilization of the reserves ($T_R - S_R$); where T_R is total reserves and S_R is 'safe' level of reserves.

On the basis of mutual co-operation and confidence and the conscientiousness with which the agreed dollar import policies were implemented by member countries, a concerted approach was made to the smooth functioning of the Dollar Pool.

Rationale of its existence

The main idea was to avoid rigid bilateralism in the trading relationships between each member-country on one hand and the dollar area on the other and instead to effect a sort of bilateral balancing between the Sterling Area as a whole and the dollar area. There were many advantages of doing this. The advantages mainly emanated from the economies of pooling together the limited dollar resources. As noted earlier, through the device of the Dollar Pool, the dollar surplus countries passed on their excess dollar earnings to the dollar deficit countries. The argument can be analysed in two alternative ways.

In absence of the Dollar Pool, the excess earnings of the dollar surplus countries would have remained idle, while the dollar deficit countries would not have the benefit of utilising them. To maintain equilibrium in their dollar balance of payments, the deficit countries would be required to increase their dollar export earnings and/or obtain more aid from the dollar area. Since we rule out these possibilities or take them into account before calculating the dollar deficits, the dollar deficit countries would be forced to impose more severe restrictions on dollar imports than otherwise would have been the case. The forgoing of the much desired dollar goods would have led to loss of economic welfare on the part of the deficit countries and hence on the part of the sterling group as a whole.

Alternatively it may be argued that the excess earnings of the dollar surplus countries arose out of deliberate attempts of reducing dollar imports. In absence of the Dollar Pool and restrictive dollar import policies, the dollar surplus countries would have followed liberal dollar import policies and obtained more dollar goods. Hence, it can be argued that there would not be any loss of economic welfare on the part of the group as a whole. This argument is untenable for the presumption is that the dollar surplus countries would have frittered away the limited dollars on non-essential imports or on imports that were less essential than those that the dollar deficit countries wouldi have obtained through the Dollar Pool. If it can be demonstrated that the marginal productivity of dollar goods obtained by the dollar deficit countries is higher than the marginal productivity of dollar goods obtained by the dollar surplus countries, then the group welfare is higher than what it would have been in absence of the Dollar Pool. Through the concerted approach to the Dollar Pool, the group saw to it that it imported relatively the most essential types of dollar goods which, by definition, contributed to the maximum to the productive efficiency and real income of the group as a whole. It ensured the most efficient use of scarce dollar resources and the maximization of economic welfare of the group as a whole.

In short, the Dollar Pool worked as a "built-in-stabilizer' or a 'stabilization fund' which assured all countries certain stable levels of dollar imports of essential character. This was most obvious when the fluctuations in the dollar balance of payments of the Sterling Area countries were of the compensatory character. The Dollar Pool facilitated offsetting of different countries' risks against one onther i.e. offsetting of dollar surpluses and dollar deficits. Even if the problem is looked at from the point of view of an individual country, the validity of the argument of stability and efficient use of dollar resources is obvious. It can simply be argued that a particular country neither frittered away its excess earnings in good times nor did it forgo essential dollar imports in bad-times through the poolings arrangements.

III

Some results of empirical study

Some of the conclusions that can be derived from Table I are given here in order to highlight the issues discussed in the foregoing section. Data presented in Table I are in the nature of estimates. With one or two exceptions like Australia, central banking authorities do not disclose their countries' respective positions *vis-a-vis* the Dollar Pool, while the United Kingdom official balance of payments statistics disclose only the group positions. i.e., of the U.K., U.K. Colonies and Rest of Sterling Area. The problem was to obtain a country-wise breakdown of Rest of Sterling Area. Table I accordingly

is an attempt at obtaining such a picture. Methods adopted in making these estimates are given in the Appendix.

(1) The group as a whole of independent countries and dominions over the period contributed (net) to the Dollar Pool dollars[2] worth £770 mn. But it should be noted that but for South Africa's[3] gold sales to the United Kingdom and its contribution of £900 mn.,[4] the group would have exercised a strain on the Dollar Pool amounting to something like £130 mn. The aggregative figures are not meaningful for purpose at hand, for they conceal divergent trends and year to year fluctuations in the dollar positions of various countries listed.[5]

(2) Countries like Ceylon and Australia show distinct trends in their overall balance of payments positions *vis-a-vis* the dollar area as reflected in their dollar contributions and withdrawals. Ceylon is a persistent dollar surplus country with an annual average contribution of £9½ mn. with the maximum of £22 mn. in 1950 and the minimum of £0.7 min in 1952. Australia on the other hand is a persistent dollar deficit country except for the years 1950 and 1951 during which Australia along with other countries of the group benefited from, the 1949 devaluations and Korean War boom. The redeeming feature in the position of both these countries was the fact that Ceylon did not mind contributing dollars to the pool against the purchase of sterling for Ceylon wanted sterling to settle its deficits with the rest of the sterling area; in case of Australia, compensation for its drain on the Dollar Pool was its persistent and high surplus with O.E.E.C. countries (vide Table III) which, through the E.P.U. settlements, indirectly helped the Dollar Pool and the dollar shortage problem of the Sterling Area as a whole. These two cases are excellent illustrations of the way the Sterling Area as regional multilateral payments system worked with advantage and convenience.

(3) Countries like India, Burma, Pakistan and New Zealand show fluctuations of varying intensities and durations in their balance of payments *vis-a-vis* the dollar area.

In case of Pakistan, the first six years of deficits are followed by two years of small surplus, to be followed again by periods of deficit and surplus, exercising on the Dollar Pool net drain of some £60 mn.

[2] And/or gold.

[3] South Africa was never a full fledged member of the Dollar Pool.

[4] Arrived at by deducting dollar withdrawals from total gold sales by South Africa to the United Kingdom.

[5] Conclusions drawn are not to be accepted without qualifications because of limitations that are inevitable in making estimates of the type given here and because of the complexity of the problem.

Here again, the compensation to the Dollar Pool was the indirect help Pakistan rendered through its surplus with O.E.E.C. countries.

Burma's experience also suggests alternate periods of prosperity and adversity in dollar fortunes; the four deficit years of 1951-54 were followed by surplus for three consecutive years leaving a negligible impact on the Dollar Pool.

Developments in New Zealand's dollar position are favourable on the whole. With the exceptions of 1948, 1949 and 1952, it has contributed to the Dollar Pool dollars worth £36 mn.

(4) In case of India, fluctuations are more pronounced though not of high magnitude. The strain that India exercised on the Dollar Pool in 1948 and 1949 was offset by its contribution of almost equal magnitude in 1950. Instability in India's net dollar position continued for another four to five years. The surplus of 1950 was mainly the result of 1949 devaluation, special incentives given to increase dollar export earnings and primary products boom due to Korean War. Because of the temporary nature of these favourable developments and because of higher imports (vide Table IV A), the situation in 1951 and 1952 turned out to be quite adverse and India made heavy calls on the Dollar Pool in both the years. To check the drain on the Dollar Pool, India intensified restrictions on dollar imports and imports were reduced by more than 50 per cent in 1953 as compared to 1952 level. As a result, India put dollars in the Dollar Pool amounting to some £17 mn. Because of deterioration both in current and capital accounts *vis-a-vis* the dollar area, in 1954, India again approached the Dollar Pool for meeting its net deficits. After 1954, India continued to contribute to the Dollar Pool, dollars in varying amounts. Over the period as a whole, India contributed more dollars than it withdrew, net contribution amounting to some £83 mn.

From this it would be rash to conclude that the membership of the Sterling Area did not benefit India on this count; one or two reservations must be noted.

(a) Over the period as a whole, India had persistent and high deficits with O.E.E.C. group of countries (*vide* Table III). They amounted to something like Rs. 845 crores (or £634 mn.). This meant a drain on the Dollar Pool, through the E.P.U. settlements of entire Sterling Area deficit or surplus between mid-1950 and end-1958. This is partly reflected in item 2 of Table II namely 'transactions of whole sterling area with non-dollar area settled in gold and dollars.' It is impossible to allocate share of any country or component of the Sterling Area in the heavy loss of gold and dollars involved in transactions specified in item 2 of Table II.

(b) Incidentally, it is to be noted that on goods and services account India had substantial deficits with the dollar area in all the years except 1950 and 1953. (*vide* Table IV A). Over the period as a whole 1948-1958, deficit amounted to Rs. 525.5 crores. This was more than offset by donations and other dollar inflows leaving an overall surplus of Rs. 110.3 crores. If this inflow were lower than the the amount of payments of Rs. 525.5 crores, India would have found it necessary to impose still more, severe restrictions on dollar imports (and other dollar payments) and/or to take recourse to the Dollar Pool.

(5) Among the rest of the countries specified in Table I, Iraq and Ireland are net deficit countries, while Iceland and Rhodesia and Nyasaland are net surplus countries from the point of view of the Dollar Pool. Once again, the compensation for Iraq's dollar deficit is its sizeable surplus with O.E.E.C. countries between 1954 and 1958.

(6) A glance at the overall picture of the Dollar Pool as given in Table II reveals some interesting features of the Sterling Area dollar problem which, I must say, have been neglected in literature dealing with the post-war Sterling Area. The Sterling Area as a whole is net dollar earner in its direct transactions with the dollar area to the tune of £549 mn. (colonies' earnings and dollar aid have played a big role), while the Area as a whole lost gold and dollars worth £1339 mn. to countries outside the dollar area. (This incidentally reflects the degree of sterling convertibility and the price paid by the United Kingdom in maintaining the status of sterling as an international currency). The net deficit of the area as a whole of £790 mn. was more than offset by the extra-ordinary economic aid obtained by the United Kingdom, of £1225 mn., thus strengthening the Dollar Pool by some £435 mn. of dollars. But for the U.K. colonies and generous dollar aid, the working of the Sterling Area Gold and Dollar Pool would have been much different and obligations of the Sterling Area membership much more restrictive.

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APPENDIX

Notes and Sources to Tables I-V

Table I *Method of estimation*

Data presented in Table I are in the nature of estimates. Data regarding various Sterling Area countries' contributions or withdrawals are not available (in published form) from either the Bank of England or the Central banking authorities of the respective countries

with the notable exception of Australia (however, efforts are being made to obtain such information from the official sources). The main basis on which estimates are made is the IMF sources which give regional breakdown of country's balance of payments in their 'Balance of Payments Year Books.' The main concern was with the country's international transactions *vis-a-vis* the dollar area; i.e. year to year transactions not only on current account but also on capital account which includes short and long term private capital, loans and amortization and movements in other assets and liabilities both short term and long term (excluding changes in country's foreign exchange reserves). After obtaining a full comprehensive (as far as possible) view of totality of country's transactions with the dollar area, net overall surplus or deficit was determined. Thus arrived at, net overall surplus was treated as contribution to the Dollar Pool with a contra-entry of increase in country's sterling reserves through sales of dollars (a debit item in balance of payments as an offset to surplus). In the opposite case, net deficit was treated as withdrawals from the Dollars Pool with a contra-entry of decrease in country's sterling reserves through purchase of dollars (a credit item in balance of payments as an offset to deficit). Thus residual method was adopted.

To make final estimates more accurate, a number of adjustments and readjustments were made in the process; while at the same time it was realised that some other necessary adjustments were impossible to make.

(a) Fund data in many cases report country's transactions *vis-a-vis* U.S. and Canada rather than the dollar area as a whole. Omission of transactions with dollar countries of Latin America would not be damaging to our estimates and results since net transactions (credit or debit) would be of very small magnitude. Wherever possible, such transactions are incorporated. Country's merchandise trade transactions with dollar countries of Latin America were possible to obtain from sources like U.N., 'Direction of International Trade.' For illustration, see notes to Table IV.

(b) Some adjustments in capital account also were necessary. Loans and credits received from or repaid to non-territorial organizations like IMF and IBRD are shown under the area-column 'others and unallocated' in Fund data with few notable exceptions. On reasonable premises, in case of some countries, such transactions were attributed to the dollar area involving dollar finance while in case of other countries, such transactions especially certain amount of loans from IBRD were altogether omitted. This procedure would obviously involve either overstating or understating the estimates in Table I. For concrete illustration of this in India's case, see notes to Table IV.

(c) An adjustment that was impossible to make and omission of which is a serious limitation on the estimates was the item errors and ommissions in country's balance of payments. Since it is impossible to attribute part of errors and ommissions to transactions with dollar area, true net surplus or deficit would be different from what we have determined. If ' net errors and omissions' *vis-a-vis* the dollar area is a positive item, then, to that extent country's contributions to the Dollar Pool would be more or its withdrawals would be less. In the opposite case, if that item is a negative one, then, to that extent, country's contributions would be less or its withdrawals would be more.

Country Notes

India—See notes to Table IV.

Ceylon—Only for 1949, transactions are with respect to U.S. and Canada rather than the entire dollar area.

Burma—For all years, transactions are *vis-a-vis* U.S. and Canada.

Pakistan—Except for 1948 and 1949, transactions are with respect to U.S. and Canada only.

Australia—Figures are not estimates but official figures, and refer to fiscal years ending June, 30.

New Zealand—For years 1953 through 1958, transactions are *vis-a-vis* U.S. and Canada Only.

South Africa—Not a full-fledged member of the Dollar Pool. Estimates are arrived at by deducting dollar withdrawals from gold sales to the U.K. as follows :

(in £ mm.)

	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958
Gold sales to the U.K.	+57	+74	+66	+68	+78	+125	+167	+189	+212	+212
Dollars withdrawals	−33	−7	−3	−2	−7	−47	−78	−74	−72	−17
	+24	+67	+63	+66	+71	+78	+89	+115	+140	+195

Iraq—For the years 1953 through 1957, transactions refer to U.S. only and for 1958 to U.S. and Canada.

Iceland—For years 1948 through 1950, transactions are with respect to U.S. and canada only.

Iceland—For all years, refer to U.S. and Canada.

Rhodesia and Nayasaland—Data for the years 1951 through 1953 take into account only S. Rhodesia's transactions with dollar area.

Conversion rates

For converting figures expressed in national currencies into pound sterling, following exchange rates are used.

In case of New Zealand, South Africa, Iraq, Ireland and Rhodesia and Nyasaland, national currencies are at par with pound sterling.

For India and Ceylon, Rs. 13.33=£1. For Burma Kyats 13.33=£1. For Australia A £1.25=£1. For Iceland, 1 Krona=0.06127 U.S. dollars and 2.80 U.S. dollars=£1. For Pakistan, Rs. 13.33=£1 for 1948, first three quarters of 1949, fourth quarter of 1955 and years 1956 through 1958 and Rs. 9.27=£1 for last quarter of 1949, years 1950 through 1954 and first three quarters of 1955.

Probable partial explanations for 'Errors and Omissions' given in Table I. The discrepancies that arise between estimates for various countries specified and listed together and official total as given by the white papers on 'United kingdom Balance of Payments' arise out of various limitations mentioned in the foregoing account of arriving at the estimates and exclusion of Jordan, Libya, Persian Gulf territories and the like from the table.

Estimates and official figures in case of India—Mention should be made of the fact that our estimates regarding India's net contributions to the Dollar Pool for a period of ten years 1948-1957 amount to $125 mn. which figure is nearer to the official figure of $154 mn. for the same period. (the latter figure disclosed by the Governor of the Reserve Bank of India in his evidence before the Radcliffe Committee; vide p. 259, Memoranda I of Committee on the working of the Monetary System—London, 1960).

Sources:—(1) Balance of Payments Yearbooks—Vols. 3 to 11, IMF.

(2) Direction of International Trade—U.N.

Table II

(1) Only for the years 1957 and 1958, figures in 1(b) are derived and those in 1(c) are estimated ones. The composite official figures for both U.K. colonies and Rest of Sterling Area were 286 and 366 for 1957 and 1958 respectively. From these, the estimated figures of the Rest of Sterling Area (219 for 1957 and 178 for 1958) were deducted and the figures for U.K. colonies of 67 and 188 for 1957 and 1958 respectively, were derived. However, for these two years, errors and ommissions would be involved for both these sets of figures but would cancel out in the composite totals as disclosed by the official sources.

(2) Figures in 2 are the composite of gold and dollar transactions of the whole of the sterling area with 'other western hemisphere,' OEEC countries (E.P.U. settlements and settlements not

brought in the E.P.U.), other non-sterling countries and non-territorial organizations.

(3) Figures in 4(a) 'Extraordinary economic aid on U.K. account' represent for the years 1948 through 1951 European Recovery Programme grants and loans obtained, for 1954 repayments to the IMF and for 1957, U.K. drawings on the IMF of 201 and contra-entry of 37 as waiver on U.S. credit obtained earlier.

Sources :—'United Kingdom Balance of Payments' Cmds. 8976, 9585, 122, 273 and 861.

Table III

The table gives overall surplus or deficit (both on current and capital accounts) of various Sterling Area countries listed *vis-a-vis* the Continental O.E.E.C. countries (i.e. O.E.E.C. countries excluding the U.K. and Ireland). Rates of exchange used in converting national currency figures into pound sterling are the same as indicated in notes to table I. For almost all countries, surplus or deficit shown for each would be mostly due to transactions on current account, since gross capital outflow to O.E.E.C. countries would be negligible and capital inflow (gross or net) would be of insignificant magnitude. *Sources* :—Balance of Payments Year Books Vols. 5 to 11 IMF.

Table IV A and B

(1) 1948 figures relate to Hard Currency areas, net transactions with which were settled in gold/dollars,

(2) Transactions on goods and services account are constituted of—

(a) those with U.S. and Canada as given in the Fund sources,

(b) mercandise trade surplus or deficit with dollar countries of Latin America, the figures for which were obtained from 'Direction of International Trade—U.N. and

(c) services transactions with all Latin American countries on the assumption that since non-dollar countries of Latin America are few in number, magnitude involved with respect to them would be negligible and will not distort the final picture (even as it is magnitudes involved in net service transactions with entire Latin America are insignificant).

(3) Details of item 6 are given in Table IV B which incorporates certain adjustments mentioned below. To Fund figures regarding Capital outflow or inflow shown under the regional

column of "U.S. and Canada," are added other known gold and dollar transactions that are shown by the Fund under the column 'other and unallocated.' Serious limitation in this regard pertains to the IBRD loans obtained. The IBRD loans obtained till 1952 are known to have been drawn in dollars and hense included in item 6. For the years 1954 through 1958, currency components of IRBD loans are not known. The total amounts were as follows :

(in crores of Rs.)

1954	1955	1956	1957	1958
0·9	2·0	14·0	49·7	73·2

Amounts for last three years are substantial. They are totally excluded from our calculations. At least part of the loans obtained during last five years must have been drawn in dollars, the exclusion becomes a serious limitation. To the extent of amount of dollars drawn, our figures for dollar inflow and hence estimates of India's contributions to the Dollar Pool are understated. (Abbreviation used F.O.A.=Foreign Operation Administration I.C.A.=International Co-operation Administration. M.S.A.=Mutual Security Agency. E.C.A.=Economic Co-operation Administration).

Sources:—The IMF—Balance of Payments Yearbooks, Vols. 3 to 11.

Table V

Notes, limitations and sources are the same as in Table IV. Figures are aggregative of the entire period of eleven years 1948-1958. Table gives a broad idea of multilateral settlements of India's sterling balances.

TABLE I

Estimates of Withdrawals from (−) or contributions to (+) the Sterling Area Gold and Dollar Pool by member countries 1948-1958

(£ mn.)

	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1948-1958
India	−14·02	−13·51	+29·79	−12·00	−42·68	+17·47	− 7·35	+18·00	+ 8·45	+79·74	+25·73	+ 82·73
Ceylon	...	+ 4·42	+22·10	+10·56	+ 0·71	+10·07	+11·34	+15·79	+14·13	+14·67	+ 1·00	+104·79
Burma	...	...	...	− 2·65	− 3·65	− 2·25	− 4·86	+ 0·74	+10·03	+ 5·06	− 2·07	+ 0·35
Pakistan	− 2·30	−12·78	− 7·36	−26·25	−14·98	− 8·10	+ 2·28	+ 3·19	− 0·28	− 0·53	+ 6·74	− 60·37
Australia	−40·80	−18·40	+ 4·80	+35·20	−47·20	− 4·00	−34·40	−43·20	−32·00	−18·40	−56·00	−254·40
New Zealand	−11·00	−13·30	+ 7·30	+ 7·20	− 0·80	+12·20	+ 6·20	+ 4·70	+ 9·40	+ 8·60	+ 5·70	+ 36·20
South Africa	...	+24·00	+67·00	+68·00	+66·00	+71·00	+78·00	+80·00	+115·00	+140·00	+195·00	908·00
Iraq	...	...	...	...	—	− 9·24	− 8·34	−14·06	− 7·14	−15·49	− 7·68	− 61·95
Ireland	− 8·10	−14·30	+ 5·90	−14·00	−12·40	− 6·70	+ 1·60	− 1·80	—	+ 5·10	+10·00	− 34·70
Iceland	...	...	...	+ 0·40	+ 0·35	+ 0·06	+ 2·08	+ 2·72	+ 3·32	+ 1·47	+ 1·10	+ 11·50
Rhodesia and Nyasaland	...	...	...	− 3·10	+ 3·70	+ 8·40	+14·60	+16·70	+ 0·40	− 1·20	− 1·10	+ 38·40
Total listed	−77·12	−43·87	+129·44	+57·46	−50·95	+88·91	+61·15	+91·78	+116·31	+219·02	+178·42	+770·55
Errors and omissions	+ 9·12	− 8·13	−15·44	−50·46	+22·95	−24·91	− 6·15	−23·78	− 14·31	...	...	...
Official Total	−68·00	−52·00	+114·00	+ 7·00	−28·00	+64·00	+55·00	+68·00	+102·00	...	...	...

(...) sign indicates lack of estimates because of non-availability of comparable data.

TABLE II

Overall picture of the Sterling Area Gold and Dollar Pool 1948-1958

(£ mn.)

	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1948-1958
1. Net surplus (+) or deficit (−) with Dollar area of												
(*a*) U. K.	−318	−285	+ 48	−529	−130	+ 10	− 28	−204	−115	+ 37	+114	−1414
(*b*) U. K. Colonies	+ 58	+ 66	+155	+174	+137	+101	+109	+131	+117	+ 67	+188	+1304
(*c*) Rest of sterling area	− 68	− 52	+114	+ 7	− 28	+ 64	+ 55	+ 68	+102	+219	+178	+ 659
Total (*a*+*b*+*c*)	−328	−271	+312	−348	− 30	+175	+136	− 5	+104	+323	+480	+549
2. Transactions of whole sterling area with non-dollar area settled in gold and dollars	− 78	− 77	− 5	− 59	−145	+ 65	− 10	−224	−300	−310	−196	−1389
3. Grand Total (1+2)	−406	−348	+307	−407	−175	+240	+127	−229	−196	+ 13	+ 284	−790
4. Above financed by												
(*a*) Extra-orinary economic aid on U. K. account	+351	+345	+268	+ 63	—	—	− 40	—	+288	—	—	+1225
(*b*) Use of reserves (increase −)	+55	+ 3	−575	+ 344	+175	−240	−87	+229	− 42	− 13	−284	− 435
Total	+406	+348	−307	+407	+175	−240	−127	+229	+196	− 13	−284	+790

TABLE III

Overall surplus (+) or deficit (−) of Sterling Area countries with continental O.E.E.C. group of countries—1948-1958

(£ mn.)

	1948	1949	1950	1951	1951	1953	1954	1955	1956	1957	1958
India	...	− 11·3	− 7·6	− 19·0	− 15·3	− 40·7	− 50·5	− 57·0	−129·2	−185·4	−117·7
Ceylon	...	+ 4·0	+ 3·7	+ 13·4	+ 5·7	+ 1·3	+ 0·2	+ 3·6	− 0·9	− 5·8	...
Burma	...	...	...	− 2·2	− 2·7	− 5·7	− 8·7	− 6·5	− 3·0	− 10·5	− 6·3
Pakistan	...	...	+ 21·7	+ 50·6	+ 9·7	+ 21·7	+ 12·4	+ 27·1	+ 14·8	+ 13·8	+ 11·2
Australia	+ 50·2	+ 66·4	+ 61·6	+118·0	− 31·6	+100·6	+ 84·2	+ 40·6	+ 37·2	+109·6	+ 55·4
New Zealand	+ 6·7	+ 10·4	+ 23·9	+ 30·8	+ 16·4	+ 26·3	+ 24·2	+ 27·7	+ 37·5	+ 42·2	+ 24·0
South Africa	...	...	...	− 28·0	− 11·0	− 25·0	− 8·0	− 17·0	− 5·0	+ 3·0	− 13·0
Iraq	...	...	...	...	...	− 12·0	+106·5	+ 80·1	+ 66·5	+ 17·7	+ 70·4
Ireland	− 10·0	− 11·1	− 15·1	− 29·2	− 20·9	− 27·6	− 22·3	− 25·7	...	− 19·6	− 23·7
Rhodesia and Nyasaland	...	...	...	− 4·7	− 0·6	+ 1·7	+ 15·8	+ 17·2	+ 19·3	+ 10·4	+ 1·9

(...) indicates non-availability of data in sources indicated.

TABLE IV-A

India's Transactions with Dollar Area and Other Gold and Dollar transactions 1948-1958

(Rs. Crores)

	1948	1949	1950	1951	1952	1953	1954	1954	1956	1957	1958	1948-1958
1. Exports f.o.b.	+136·8	+89·2	+148·3	+183·6	+151·6	+118·7	+107·9	+118·4	+119·6	+192·7	+101·7	+1468·5
2. Imports c.i.f.	−177·3	−120·9	−119·3	−247·1	−279·4	−117·5	−120·1	−131·1	−180·7	−286·8	−237·2	−2017·4
3. Trade balance	− 40·5	− 31·7	+ 29·0	− 63·5	−127·8	+ 1·2	− 12·1	− 12·7	−61·1	− 94·1	−135·5	− 548·9
4. Services (net)	− 2·2	+ 0·1	− 1·0	− 0·3	+ 5·3	+ 0·4	− 0·4	− 0·1	− 2·6	+ 8·8	+ 15·3	+ 23·3
5. Goods and services(net)	− 42·7	− 31·6	+ 28·0	− 63·8	−122·5	+ 1·6	− 12·5	− 12·8	−63·7	− 85·3	−120·2	− 525·5
6. Donations, grants loans received and other dollar capital inflow (net)	+ 22·8	+ 13·6	+ 11·6	+ 46·6	+65·6	+ 21·7	+ 2·7	+ 36·8	+68·3	+191·6	+154·5	+ 635·8
7. Overall position	− 19·9	− 18·0	+ 39·6	− 17·2	− 56·9	+ 23·3	− 9·8	+ 24·0	+4·6	+106·3	+ 34·3	+ 110·3

TABLE IV-B

Details of item 6 Table IV-A (Capital inflow + : Capital outflow −)

(Rs. Crores)

	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958
Capital transations with DOllar Area :											
Private capital	—	—	—	—	—	—	+ 0·2	+ 0·9	+ 2·6	+ 8·2	+4·8
FOA/ICA loans	—	—	—	+38·0	+52·6	—	—	+ 1·1	+14·0	+ 9·9	+17·0
U.S.M.S.A. loans	—	—	—	—	—	—	—	—	—	—	+ 1·8
Canadian loans	—	—	—	—	—	—	—	—	—	—	+21·6
Loan repayments	—	—	—	—	—	—	—	—	—	−75·4	− 0·5
ECA grants	—	—	+ 2·1	—	—	—	—	—	—	—	—
Short term assets (increase−)	—	− 3·9	—	—	—	—	+ 5·9	+ 3·5	− 0·9	− 2·8	+ 1·7
Short term liabilities (increase +)	—	—	—	—	—	—	+ 0·5	− 0·5	+ 9·6	+119·4	+65·8
Donations	—	—	—	+ 4·6	+12·0	+23·4	+20·0	+53·1	+53·2	+38·6	+41·9
Other known dollar transactions											
IBRD loans	—	+ 7·0	+ 9·5	+ 4·8	+2·7	—	...	...	...	...	...
Repayments to IBRD	—	—	—	− 0·8	− 1·7	− 1·7	− 1·7	− 2·0	− 2·1	− 1·6	− 1·7
Use of IMF Credit	+22·8	+10·5	—	—	—	—	—	—	—	+95.3	+ 2.1
Repayments to IMF	—	—	—	—	—	—	−22·2	−19·3	− 6·0	—	—
Subscriptions to IFC	—	—	—	—	—	—	—	—	− 2·1	—	—
Grand Total	+22·8	+13·6	+11·6	+46·6	+65·6	+21·7	+ 2·7	+36·8	+68·8	+191·6	+154·5

(...) sign indicates lack of comparable data

TABLE V

India's International Transactions : Regional Pattern (Aggregate for the period 1948-1958)

(Rs. Crores)

	Current transactions surplus(+) or deficit(−)	Capital transactions inflow(+) or outflow (−)	Net	Errors and Omissions
Sterling Area	+ 247·5	— 61·6	— 185·9	—
Dollar area	— 278·7	+ 389·0	+ 110·8	—
	— 525·5 (exluding donations)	+ 635·8 (including donations)		
Continental O.E.E.C.	— 886·3	+ 40·6	— 845·7	—
Rest of world	— 259·0	+ 204·7	— 54·3	—
Total	−1176·5	+ 572·7	— 603·8	— 247·0
			— 850·8 = Decline in foreign exchange reserves	

REVIEWS

Next Step in Village India—A Study of Land Reforms and group Dynamics by BALJIT SINGH, Asia Publishing House, Rs. 9.50, p. 135

OVER the course of last decade or so a comprehensive programme of land reforms has been evolved in this country. The broad contours of the programme were discernible even at the beginning of the period. There was a great degree of unanimity with regard to socially desirable relationships in land. The unification of the tenures by converging them at *ryotwari* system, the abolition of functionless intermediaries and giving the tillers the right to own the land were major premises on which the programme of land reforms was based. This programme which aimed at rationalising the tenurial conditions in agriculture is more or less completed in all the States. Yet there is a feeling among the students of Indian agriculture that even after these legislative measures the agricultural section of the economy has not emerged as a viable sector. On the question of next step to be taken, there is a wide difference of opinion.

According to one school of thought, it is time now to cry a halt to the spate of the legislation aimed at further changes in the countryside by State fiat. It is time, according to them, to consolidate the results of the changes brought about by the previous legislation, to seek for their proper implementation and to concentrate the resources on increasing the productivity on existing farms. According to another school of thought, so long as the operational size of holding is not optimised it is unrealistic to expect buoyant response from agriculture.

Unfortunately, most of this debate is being conducted on *a priori* grounds without having any basis on scientifically observed facts. In this context a study, like one undertaken by Prof. Baljit Singh, is of great value as it is based primarily on actual field observations in certain villages of Eastern and Western districts of Uttar Pradesh. The book gives further promise as it starts with the assertion of mutual impact of social relationships on institutional change and vice versa, a fact which is sadly neglected in most of the attempts in evaluating the land-reforms.

In brief, Prof. Baljit Singh's thesis is that Indian agriculture has not responded to the stimuli provided by the economic growth. The stagnation in Indian agriculture is not so much for resource imbalance as for the social and institutional structure of village India which he terms as "faction society". Individuals in such a society belong to small, separate and antagonistic groups. Because of these narrow and exclusive loyalties, every faction "respects and fights for status quo

so that members of opposite factions may not gain or improve". Progress itself becomes unwanted because members of different factions feel that while it may benefit them it may also benefit their opponents and that they would like to prevent at any cost or sacrifice.

The main breeding ground for the factions, according to the author, is the private ownership in land. It not only gives rise to the factions, it also sustains them. The remedy to correct this situation is to weaken the private property in land and its progressive replacement by cooperative ownership. It is maintained that gradual cooperatization of land is a felt need of villages. Opposition, existent or potential, to such move is exaggerated. Prof. Baljit Singh has made an eloquent case for the pattern he supports. It is suggested that the conclusions are arrived at after a field survey, though they are supported by the theoretical considerations and also by actual observation of the country's economy.

While his intuitive grasp of the situation carries conviction, the results of his survey do not lend him adequate support. Though the reader will be impressed by the author's apt description of rural society as a 'faction society', he would look in vain for a precise definition of a 'faction'. Nor will he ever know how different factions are distinguished. Presumably these are largely the group alignments pivoting round the ownership and use of land. But at most of the places the author has identified them on the basis of kinship and lineage (see for instance, p. 13). In a caste society there is a possibility of correspondence between the two determinats but there is no certainty that they would. More so, when the author maintains that "a caste society is socially self contained but economically interdependent" (p. 11). The author has given the exact number of factions in the villages surveyed. One naturally wants to know how these factions are identified. What are the criteria used and techniques adopted in discerning one faction from other.

A perusal of the questionnaires appended at the end of the book and analysis of the answers in the text makes it obvious that either adequate response was not available to many questions or the material collected during the survey is not fully utilised. Out of the 53 questions in the household schedule, answers to barely a dozen are analysed in detail and used in the text. The bulk of 23 tables included in the text present data for which there was no necessity to go to field and conduct a survey. Undoubtedly in any work of research background data are provided to give a context to the results arrived after a field survey, but one usually presses one's claims on the new data collected during the study.

The interpretation of the data also leaves much to be desired. An impression is created that the author is in a haste to arrive at his findings. For instance, as answer to an open-ended question asking

the respondents to suggest three important reforms, we find that only 8 per cent of the total responses were in favour of cooperative farming. Yet the author considers it a significant response (p. 57). To a suggestive question, whether the respondents would accept cooperative farming, the findings are that 55 per cent to 65 per cent of the households of the surveyed villages are at present opposed to the introduction of joint farming (p. 62) Yet the measure is called a felt need of substantial sections of the villagers. Not even the ardent supports of cooperative farming place their claim on its popular appeal.

Nor does the case for cooperative farming rests on the highly refined but equally unrealistic norms of optimization of resource allocations, which are usually applied in the discussion of an 'optimum firm'. The conceptual framework suggested by the author to examine the viability of cooperative farms will have to be made much more elastic to make it serve the desired purpose.

In the end of his study Prof. Baljit Singh does not provide any surprise. His emphasis on 'an integrated approach' is unexceptionable. There is already a school of thought which would agree with the author that the ceiling on the land should be at a much lower level than provided in most of the legislation. A plea for preferential treatment to the cooperative will be endorsed by a number of people.

This does not mean that next steps in village India can be easily charted. At every step a host of new problems arise. To mention only a few—are we to permit a mixed economy of peasants and cooperatives in the contryside; what should be the relationship of the policy of land redistribution with the policy of cooperative joint farming; which section of the farmers should be encouraged to join the cooperatives; should there be any compulsion in making non-viable farmers to join a cooperative farming society; what safeguards should be taken so that the cooperative farming may not lead to immobility of labour; and the most crucial problem of the mechanism which will ensure that these institutional changes will also release the captive clan of submerged peasantry and will result in enhancing agricultural productivity. The next steps in village India will be concerned with many problems of interim adjustments and ultimate goals. In solving these the present study will be of limited guidance.

Vallabh Vidyanagar. V. S. VYAS

British Industry: Change and development in the twentieth century: by S. H. DUNNING and C. S. THOMAS. Hutchinson and Co., London 1961. 232 pages. 12s. 6d.

EXCESSIVE dependence on the staple trades, viz: coal-mining, iron and steel, ship-building and textiles; and the failure of the state to maintain

full employment and pressures for efficiency sum up British difficulties from 1921 to 1939. During the second half of this period i.e. 1931-39, we had increased State intervention and rearmament but basic difficulties were not overcome. On the other hand, during 1939-60 we have the rapid development of oil refining and nuclear energy; the growth of the aircraft, electronic, chemial and motor car industries; and a general expansion of the staple industries, excepting textiles, so that their share in total output and labour force is today only slightly less than it was in 1939. The State now concerns itself with fully employment and the encouragement of competition. Technological progress, initiated by war organisation, has continued to be rapid, resulting in the discovery of new raw materials and processes, and Britain now looks with same equanimity at her balance of payment position.

The shift in the type of industries that are important and the revitalisation of some of the older ones has led the writers to a closer study of the political and economic factors interacting with technological change. The book does not attempt this exhaustively or in an integrated manner but gives a general historical account that should contribute towards such understanding.

M. V. NAMJOSHI

Cost Studies in Agriculture, INDIAN SOCIETY OF AGRICULTURAL ECONOMICS, BOMBAY, 1961, pp. V + 176. Price Rs. 8.00

THIS is the report of the seminar on cost studies in agriculture, convened jointly under the auspices of the Indian Society of Agricultural Economics and the Indian Society of Agricultural Statistics, at Matheran in October-November 1960. It contains, besides nine papers of high research and practical utility, deliberations on the subject by 23 agricultural economists and statisticians for a period of eight days. No doubt, it "will supply valuable guidance to the researcher as well as the policy maker interested in the various aspects of agricultural development".

The interest recently witnessed in farm cost studies is largely due to the growing demand made on the reliable data for the purpose of both formulating and evaluating a number of agricultural economic policies. Quite often, far reaching policy decisions (e.g. ceiling on holdings) made without enough dependable material are 'in a way unscientific'. At the same time, it is significant to note the complaint that "little use has hitherto been made by the authorities" of the available information and that "they did not show any interest or anxiety in securing data." It is necessary to ensure greater collaboration between those who are interested in policy making and those who are in a position to supply them material for the purpose of policy

decisions. Such a collaboration will prove mutually beneficial and help to improve the quality of each other's work. Similarly, much greater coordination is urgently called for between users of these data on one hand and technicians who design farm management surveys and are concerned with data collection and tabulation on the other. Lack of coordination between them results into endless confusion and controversies and seriously restrict the usefulness of the collected data.

The discussions are conveniently divided into two parts, namely, uses of cost studies and methodological problems connected with them. Primarily, there are two types of uses, the micro use and the macro use, the former pertaining to individual or group farm management and efficiency and the latter to general economic policies covering a wide range of topics such as taxation, price stabilization, rural credit, land reforms, cooperative farming, etc. In using the cost data for the purposes of policy and analysis, it was emphasised that several factors are to be borne in mind. Due caution should be exercised in using them and the limitations and dangers should be explicitly stated. Farm cost studies may not be loaded with extra responsibility of supplying material not strickly needed. And, in drawing conclusions regarding other macro-economic phenomenon, the complex agro-economic factors of the region should also be brought out. In the micro uses, cost studies can provide useful information to secure measures of efficiency on the farm and of the farmer. They also can bring out factors which would aid farmers in making adjustments in farm organisation and in decisions-making processes in farm operations and management. It was emphasised that the findings and potentialities of such surveys should become increasingly useful to the individual farmer who should know more precisely how much he spends on agriculture and how much he gets.

The methodological problems in cost studies are many and complex. They broadly relate to (i) concepts and definitions (ii) apportionment, evaluation and allocation of costs (iii) design of cost studies (iv) problems of field data collection and (v) analysis and interpretation. To illustrate, let us take any one concept viz. 'cost'. It has no definite connotation, and surely there is no standard concept of cost. One cost concept is different from another, each has its own use in economic analysis and before using any, it is necessary to clarify its meaning and significance. Again, what should be the principles followed in measuring costs? Should it be, say, opportunity cost, or production cost or historical costs? These and similar other questions arise in connection with various methodological aspects enumerated above. Though it was not the purpose of the seminar to come to any conclusion, it has helped to locate the issues, outline them and lay down important directions that will be immensely useful in the future.

This seminar was, in a way, a stock-taking exercise. Most of the participants themselves have been doing considerable work on the subject, and in the process have come to a stage where they thought it advisable to share each other's experiences and seek guidance regarding their doubts and difficulties. The seminar has served this purpose. It has also indicated the directions in which further work should proceed. This report is a very valuable addition to the literature in agricultural economics. The editors deserve special compliments for preparing in such a short-time an excellent report out of the mass of material which is at thier disposal.

Bombay — A. C. SHAH

Some Problems of Underemployment by N. A. MUJUMDAR (Popular Book Depot, Bombay 7, Price Rs. 25/-)

MOST of the studies on the phenomenon of underemployment face heavy odds, since data are difficult to obtain. Even the case of Dr. Mujumdar's study, in review here, which attempts to analyse it in the context of Indian conditions, is not an exception. The theoretical discussion in the first two chapters highlights the major characteristics of the phenomenon and indicates clearly that the causes of its manifestations are quite different from those given by the prevailing Keynesian Theory. The author also admits fully the existence of various shortcomings in the definition so far adopted. Inspite of this it is surprising to find him making advances to apply the same theoretical model to ascertain the emergence of the phenomenon in the Indian Agriculture. In support of the thesis, factors like the increase in the pressure of population on land, diminishing size of holding, no change in the area under food crops, inelasticity of demands for agricultural production etc. have been analysed for a period of 45 years, from 1900 A.D. to 1945 A.D. It is known that these are the common factors usually advanced to make out a case for the cumulative process of stagnation in agriculture in an underdeveloped economy and therefore the picture made out does not seem to be so much in balance. Again, from the discussion, it seems that the temporal and the productivity aspects of disguised unemployment have been mixed up. For example, the author recognises the fact that ' while the pressure of population on land is relatively low, the problem of agricultural unemployment due to population growth can to a large extent be solved by the continuous adaptation of methods and pattern of land utilization in the direction of increased labour requirements. Thus it is quite evident that the author recognizes the efficacy of such methods and patterns of land utilization as agents to increase the employment potential in agriculture. After having cited several examples of these methods and patterns, he goes on observing that ' as population continues to grow, sooner or later a point is reached beyond which the labour requirements in agriculture cannot be raised

any further.' This is quite in line with the hypothesis only as regards the time aspect. Even granting this does not give any support to the case. This is because no where do we find any evidence to prove that such a point as mentioned above has been reached in Indian agriculture. Besides, some important points which may be regarded as significant for creating employment potential in terms of time have been ignored. For example, over decades, the fall in per capita cultivated land is not so relevant as the increase or decrease in the area under crops having high or low intensity of the use of labour with the increase in population. In that respect it is difficult to foretell, what the author intends to deduce even from the figures of population, cultivated area and agricultural output given in table IV in chapter III.

Again, nobody should object to the use of a tool of measurement provided it is precise. The author has accepted 'work norm' as a tool to measure underemployment. In order to shape it in the required form, the concept of Standard Holding has been introduced. Now, employment on land is a function of many factors, such as size of holding, quality of land, climatic conditions, crop-pattern, capital intensity etc. Apart from any theoretical implications, the problem here is, how far is it closer to reality to assume these factors as constants, as it has been done so in the concept of Standard Holding? There are evidences in support of an answer in the negative. For example, take the quality of land. From the Survey Settlement reports of several villages, it may be found that the land within the limits of a single village is often divided into more than four classes for the purpose of assessment. It is known that the classification is done on the basis of the quality of land. Thus the difference in the quality of land as may be inferred from the rate of assessment is sometimes as high as 1:12. Similarly it is difficult to understand why the role of capital should be ignored as is done by the author. Besides, the postulate of constant crop pattern visualized in the context of the Standard Holding would amount to mean that the proportion of area of each crop grown on any of the cultivated holding, irrespective of its size, should be equal to that of the area of each crop grown on the Standard Holding. It Should be, because crops have different intensities of employment potential. From the observations made on this point, one may bank on very little support for this. From these and probably a few more of such controversial aspects, one has to be really sceptical about the potency of the tool so forged out.

It seems, even from a cursory view taken of the illustrative model given in the subsequent pages, that had it been possible to obtain a full picture of the crop calendar of the selected farmers, the author would have thought of adopting a technique different from the one presented in the book.

The author's major contribution is in raising the problem and providing some perspective. Measurement is difficult and even impossible if all the requirements of the theory are to be satisfied. We only therefore welcome the book for the contributions it makes.

Bombay K. R. PATEL

Has Capitalism Changed? An International Symposium edited by SHIGETO TSURU. Contributors : John Strachey, Paul M. Sweezy, Charles O. Bettelheim, Yakov A. Kronrod, Maurice Dobb, Paul A. Baran, John Kenneth Galbraith. Publishers : Iwanami Shoten, Tokyo, 1961. 222 pages.

HAS capitalism changed ? There is agreement on the changes that have to be taken into account though there are differences as to whether these are important enough to constitute a change in capitalism. Since the end of World War II capitalism has not experienced a cyclical crisis, though minor fluctuations in activity have occured. This is true even of the U.S.A. immediately after the war, when military expenditures were reduced from 88.6 billion dollars in 1944 to 13.3 billion dollars in 1947. Several factors explain this. The war period may be compared (as Yakov A. Kronrod does in his article) to a slump in so far as the exhaustion of inventories and the building up of pent up demand are concerned. This, and new factors such as growth in certain countries coming to depend as much on technical progress as on capital formation help to explain the absence of cycles. High levels of military expenditure, of instalment buying, of wasteful expenditures, and the increased efficiency of the State in redistributing incomes distinguish the situation of the 1950's from that of the 1920's. There is, of course, no certainty that it will continue to be sociologically possible to take the steps necessary to avoid cycles.

Two contemporary dilemmas of capitalism that are closely associated with the problem of cycles naturally receive the attention of some of the participants and may be specially mentioned. (i) The difficulty of reconciling full employment and growth with increasingly equal distribution. (2) The interaction of the public and private sectors which leads to wastes in both in order to maintain levels of expenditure and activity without bringing the two sectors into conflict. In this context Paul A. Baran mentions that in the U.S.A. in 1956 $ 42 billion were spent on military purposes, $ 1.5 billion on economic aid to underdeveloped countries, $ 27 billion on automobile transportation, $ 15 billion on education, $ 3 billion on recreation, $ 0.6 billion on books, $ 0.5 billion on research and $ 0.6 billion on the services of stockholders and investment counselors. These figures are very crude and expenditures for military purposes and economic aid have altered very substantially thereafter, but they illustrate the dilemma of the interaction of public and private wastes in consumption under capitalism.

The preoccupation with cycles and problems associated with them is partly a result of the essays in the symposium being a reaction to Prof. Shigeto Tsuru's paper. The problem of cycles is no doubt one of the most important in understanding capitalism. To answer the question in the title *viz.* "Has Capitalism Changed ?", one must however also take into account other aspects of capitalism, especially changes in the social base or in the opportunities to share advantages and power within capitalism.

Citing a few statistics and facts not found in the symposium will perhaps help the busy reader to get the essential perspective. The U.S.A. account for around one-third of world national income and net worth and for about one half of these quantities if only the capitalist world is considered. Apart from this regional concentration, the total number of shareholders in all capitalist countries taken together is well below 3 crores and a small percentage of these would control the bulk of the capital. In 1956 the 200 largest corporations controlled 50% of total net assets of corporations in the U.S.A., and 33% in the U.K., while in India the 200 largest managing agencies would represent about 60% of total paid-up capital of managed companies. The wealth of the industrial and trading sector in the capitalist world may be said to be equally divided among a few hundred companies, intermediate size joint-stock companies and family firms. As regards patterns of recruitment to the business elite, the family and direct inheritance appear to be much more largely replaced by various types of executive promotion in U.S.A., U.K. and Germany than in France or in India. This general picture of a failure to widen participation sufficiently is as much a crucial factor in the power of this system to survive as is the phenomenon of cycles.

Apart from its intrinsic interest the symposium is highly interesting to those interested in the sociology of knowledge. Important divergences of intellectual interests among the participants and countries which they represent are revealed. Thus Prof. Galbraith notes that 'in recent years the issue of economic power, and particularly that of the power of the great corporations, has receded as an issue in the United States.' It may be held that in India the opposite phenomenon is taking place.

Yakov A. Kronrod's stress on a breakdown in capitalism rather than on a slowing of growth owing to public and private waste would appear strange to those in another atmospere. It is unforunate that the symposium did not include more material on problems of capitalism as seen in Europe, and particularly in Asia, rather than as seen in the U.S.A. and U.S.S.R.

M. V. NAMJOSHI.

NOTES

Patinkin Controversy—the outcome of it.

THE 'classical'[1] static theory of value and price, both in its micro (Walrasian) and macro (Casselian) versions, involves, we have long been told, a dichotomisation of markets; relative prices and equilibrium quantities are uniquely determined in the 'real' sector of the economy described by excess-demand functions for commodities supposed to be homogeneous of degree zero in absolute prices [i.e. Xi (p) = Xi (λ p)]; and the absolute price level is determined in the monetary sector characterised by a monetary constraint, such as the Cambridge equation relating the demand for money considered as a flow to the supply of money considered as a stock via an institutionally determined constant. Lange and Patinkin have questioned the internal consistency of this system.

I

In an economy with n goods, the n-th being money, we have (n-1) excess-demand equations for commodities,

$$X_i\left(\frac{p_1}{p_{n-1}}, \ldots\ldots, \frac{p_{n-2}}{p_{n-1}}\right) = 0 \,(i = 1, \ldots\ldots, n-1) \quad \ldots \quad (1)$$

but (n-2) variables i.e. relative prices. This fact, however, is not sufficient ground for the inference that the system of commodity equations is therefore inconsistent. As Hickman points out, when a system of m equations involves $r < m$ variables the *a priori* conclusion is that the system is either not consistent or not independent. So if the system is to be proved consistent in the mathematical sense, one has to show the dependence of commodity equations so that any solution of (n-2) equations in the system is also a solution of the (n-1)-th equation.

The necessary and sufficient condition for (linear) dependence of a set of equations is that all the determinants of the n-th order in Jacobian vanish where n is the number of variables. And it can be shown that the vanishing of the Jacobian follows necessarily from the homogeneity postulate.[2] Thus, generally speaking, if a set of equations is all homogeneous of degree zero, they are linearly dependent.

[1] It is to be made clear that where we use the term 'classical' we are using it not in the sense in which historians of economic thought would use it. We are only describing a formal version of the model generally accepted by the major participants in the controversy as to fall under the rather unfortunate label, 'classical.' What the classicists *really* said on the matter is not discussed in this paper, except very generally.

[2] For proof, see Appendix below.

Any one of the (n-1) excess demand equations for commodities being linearly dependent on (and hence derivable from) the rest, we have now (n-2) independent equations to determine (n-2) variables and the system is not overdetermined.

To take Hickman's simplified example of the Casselian system with 2 (real) commodities :

$$D_1 - S_1 \equiv X_1 \equiv d_1 \frac{p_2}{p_1} - s_1 \frac{p_1}{p_2} = 0 \quad \ldots \quad \ldots \quad (2)$$

$$D_2 - S_2 \equiv X_2 \equiv d_2 \frac{p_1}{p_2} - s_2 \frac{p_2}{p_1} = 0 \quad \ldots \quad \ldots \quad (3)$$

[d_1, d_2, s_1, s_2 are positive parameters]

We have 2 commodity equations but only one relative price. Consistency in the model requires that the commodity equations be dependent. 'A necessary and sufficient condition (for dependence) is that the determinant of the matrix of the coeefficients of X_1 and X_2 vanishes i.e. that $s_2 = d_1 \frac{d_2}{s_1}$.' If this condition is satisfied (as it is, by means of the homogeneity postulate), then by solving either of the commdodity equations we get the relative price and hence equilibrium quantities.

$$\left(\frac{p_1}{p_2} = \sqrt{\frac{d_1}{s_1}} = \sqrt{\frac{s_2}{d_2}} \right)^{8}$$

II

Having thus determined relative prices in the real sector, the classical model would then postulate the Cambridge equation containing an

$$M_0 = k \sum_{i=1}^{n-1} P_i S_i \quad (M_0 \text{ and } k \text{ are given constants})$$

[8] But as Hickman points out, we cannot say without more information that there is a *unique* solution for the relative price. He thinks that the time-honoured procedure of counting equations and variables (for ensuring consistency) is completely beside the point. In simple linear systems, an indeterminacy (an infinite number of solutions) can be detected when the system contains more independent equations than variables. But in the theory of general market equilibrium, too little is known about the structure of the functions or the domain of their parameters for this procedure to bear fruit. The solution may not be unique and may not be acceptable (if it contains negative or complex quantities). Hickman would rather examine, by means of information *external* to the system, each specific system of equations for its specific consistency. Say's Law, in the classical system, is supposed to provide such external information or what Hickman calls 'side conditions.'

$$\text{or } M_0 = k\ p_{n-1} \sum_{i=1}^{n-1} \frac{P_i}{P_{n-1}} S_i \quad , \quad \ldots \quad \ldots \quad (4)$$

additional unknown (P_{n-1}) to determine the set of equilibrium money prices. Since this equation is linear in the new unknown, its addition to the system does not affect the latter's mathematical consistency.

Patinkin, however, denies the *economic* consistency of this procedure of arriving a determinate solution, arguing that it involves two contradictory excess-demand functions for money : (i) excess demand for money = total amount of money demanded in exchange for goods minus the total amount supplied in exchange, or

$$X_n = -\sum_{i=1}^{n-1} P_i X_i.$$

This 'mirror-image' (Valavanis' term) excess demand function for money follows from Walras' Law $\left(X_n + \sum_{i=1}^{n-1} P_i X_i \equiv 0\right)$. Since the physical volume of transactions is independent of the absolute price level in this model, the money value of transactions varies in proportion to the price level, and so Xn is homogeneous of degree one in aboslute prices. (ii) the excess demand function for money to hold, obtained from the Cambridge equation, where demand for money (k times the money value of transactions) is homogeneous of degree one in absolute prices, while the stock supply of money is an institutionally determined constant (homogeneous of degree zero in absolute prices) and so the excess-demand function which is the difference between the two components (homogeneous of unequal degrees) is non-homogeneous. It is alleged that the existence of these two functions makes the model inconsistent.

Without the Cambridge function, if a solution (p) of the model—(p) is a shorthand for the price-vector $(p_1, \ldots . p_{n-1})$—is arbitrarily changed to (λ p), the goods market will still be in equilibrium (homogeneity postulate) and hence the money market (Walras's Law). The system thus leaves money prices indeterminate and if it is in equilibrium at a given set of absolute prices, it will remain in equilibrium for any multiple of this set. And if a stock demand function for money of the Cambridge type is introduced while there would be no mirror-image excess demand for money at the changed absolute price level, Cambridge equation will show an excess demand. Thus, as Patinkin summarises his criticism, 'with the quantity theory the excess-demand functions (of the system) are inconsistent; without the quantity theory, its system of excess demand equations is indeterminate'. Thus homogeneity postulate, Walras's Law and the Cambridge equation do not

go together; one or the other has to be dropped. Patinkin drops the homogeneity postulate and obtains a model with a dynamic process via the 'real balance effect'; Archibald and Lipsey drop Walras's Law and obtain a consistent static model which makes economic sense only in equilibrium.[4]

III

But is the co-existence of the homogeneity postulate, Walras's Law and the Cambridge equation in the static classical model so very inconceivable? It is really so much of a 'monstrosity' as Baumol supposes it to be? Let us investigate the question. Patinkin and others have interpreted the Cambridge equation of exchange as depicting an excess-demand function for money. But the logic of the static classical model more easily lends itself to the interpretation that the Cambridge equation (or rather the quantity equation of exchange) is not a behaviour equation at all. It is difficult to find motives for holding money in a static system that is no way connected with preceding or succeeding points in time. It would be wrong to regard, with Lange and Patinkin, the cash balances of the Cambridge equation as *desired*. [Since by Say's Law money is not desired, $Xn \equiv O$, they accordingly find a contradiction between Cambridge equation and Say's Law.] In the classical system, money is not desired (like commodity stocks or flows) as such and does not motivate exchange. So, as Valavanis argues, neither the Cambridge nor the 'mirror-image' money equation constitutes a market equation in the sense in which such equations apply to commodities. The Cambridge equation is nothing but a 'technological restriction' on the rate at which money can move; money balances are institutionally required to be equal to k times the value of transactions. On the other hand, the 'mirror-image' equation is nothing but a reflection of the fact that barter operates through a monetary medium and is thus not a behaviour restriction at all. The two equations cannot therefore be dubbed as economically inconsistent, since they are on entirely different planes and have no logical relation (in economics) between them.

The Cambridge function

$$(k\, p_{n-1} \sum_{i=1}^{n-1} \frac{p_i}{p_{n-1}} \cdot S_i - M_0)$$

[4] Bent Hansen also drops Walras's Law and puts forward a quasi-equilibrium theory which includes the usual Walras system and its reactions to changes of data as a special case (*A study in the Theory of Inflation*, Ch. VIII). Hansen refers in a footnote to Haavelmo who has also shown how it is possible to treat those homogeneous systems which have too many equations from the static point of view by introducing certain dynamic relations.

is not thus *identically* equal to the excess-demand for money (X_n), but is equal to it only for a specific price level; it is, in other words, a true constraint (an equation of condition). And once we recognise this, the Lange-Patinkin contention does not follow.

$$X_n = k \cdot p_{n-1} \sum_{i=1}^{n-1} \frac{p_i}{p_{n-1}} \cdot S_i - M_0 \quad \ldots \quad \ldots \quad \ldots \quad (5)$$

(for a specific price level)

(Say's Identity and Walras' Law) $\quad X_n \equiv 0 \quad \ldots \quad \ldots \quad (6)$

But from this, we *cannot* conclude[5]

$$k \cdot p_{n-1} \sum_{i=1}^{n-1} \frac{p_i}{p_{n-1}} \cdot S_i - M_0 \equiv 0 \quad \ldots \quad \ldots \quad \ldots \quad (7)$$

(the 'identity which holds for *any* value of P_{n-1} and, therefore cannot serve to determine P_{n-1}')

So it seems, in order to get a consistent static model of the classical price system, it is not necessary to drop Walras's Law. (By doing so, Archibald and Lipsey led themselves to the rather strange position of having a model which is characterised by the dropping of Walras's Law that, admittedly, makes economic sense only when it just happens to meet the requirements of Walras's Law; as Baumol puts it, 'the de-Walrased model is consistent but rather silly'.) What is necessary is only a reinterpretation of the quantity equation of exchange in the classical model.[6]

IV

Our next consideration will be that of the interpretation of Say's Law for the model—a much-vexed question. While on the one hand, Say's Law, despite Modigliani's assertion to the contrary, is, as we have seen above (see footnote 3), necessary to insure a *unique* solution for relative prices in the classical system, on the other hand, there is

[5] As José Encarnación argues, the form—

$$\left.\begin{array}{l} C = A - B \\ C \equiv 0 \end{array}\right\}$$

$\therefore \quad A - B \equiv 0$ is valid.

[6] Archibald and Lipsey also observe that Lange's error lies in believing that excess of demand for money over the supply as given by the monetary equation is *identical* with the *desired* change in money balances; but they seem to attribute this to the 'mistaken belief' that Walras's Law holds identically in the model. But the mistake should rather be traced to Lange's interpretation of the quantity equation.

evidence enough to question the Keynes—Lange interpretation of Say's Law as an identity $\left[:\sum_{i=1}^{n-1} p_i D_i \equiv \sum_{i=1}^{n-1} p_i S_i \right]$ As Schumpeter has so convincingly demonstrated, Say's Law was not intended as an identity in the classical system (Becker and Baumol, and even Patinkin have endorsed this view); his 'interpretation of Say's Law amounts to replacing the identity signs ($\equiv$) by equality signs ($=$), valid only in a state of perfect equilibrium'. If this interpretation is accepted, the question remains whether our demonstration above of the consistency of the classical price system is affected in any significant way. It can easily be seen that the replacement of the 'identity'-interpretation of Say's Law by the 'equality'-interpretation nowhere tampers with the substance of our argument, so long as we are concerned with comparative-static questions. On the contrary, it strengthens the classical case:

$$X_n = K \cdot p_{n-1} \sum_{i=1}^{n-1} \frac{Pi}{p_{n-1}} \cdot S_i - M_0 \quad \text{(Cambridge equation)} \qquad (5)$$

$$X_n = 0 \qquad \text{(Say's 'Equality' and Walras' Law)} \qquad (6a)$$

$$\therefore k \cdot p_{n-1} \sum_{i=1}^{n-1} \frac{p_i}{p_{n-1}} \cdot S_i - M_0 = 0 \qquad (7a)$$

Equation (7a) can now be legitimately used to determine P_{n-1}.[7]

So it is rather strange that since the appearance of Lange's seminal article, almost all the contributors to the controversy—both for and against the Patinkin position—have in their discussion taken for granted the 'identity'-interpretation of Say's Law.[8]

[7] In terms of Encarnación's syllogism—

$$C = A - B$$
$$C = 0$$
$$\therefore \quad A - B = 0$$

[8] Archibald and Lipsey would perhaps argue for the necessity of Say's *Identity* to make the classical real sector determinate. They can show that Say's *Equality* may not satisfy what they consider to be one of the conditions of a 'full static equilibrium solution'—an equilibrium distribution of real balances. If the commodity demand and supply functions are to give 'balance equilibrium' at *every* set of relative prices for all individuals, the aggregate excess demand for goods in general must be zero at every set of relative prices, which is Say's Identity. But this requirement arises only because they allow for real balances in the utility function, and thus depart from the strict classical model. According to the classical 'veil' theory of money, money has no value of itself and serves as the medium of exchange, and, therefore, money received must be repaid. When this is applied to a stationary economy where the elasticity of expectations is unity, it follows,

(Foot note continued at the bottom of page 234)

V

Thus the homogeneity postulate, Say's Law, Cambridge equation and Walras's Law may all co-exist quite consistently in the static classical model which does determine relative and absolute prices in two separate compartments. Such a model may be unrealistic and unattractive to the monetary theorist, but it is at least free of inconsistencies. This gives the lie to Patinkin's categorical assertion that 'it is generally impossible to isolate a subset of markets which can determine the equilibrium values of a subset of prices' and that the real balance effect (denial of the homogeneity postulate) provides 'the ultimate rigorous validation of the classical theory of money itself.' On the other hand, to do justice to Patinkin, it should be admitted that the absence of a real balance effect deprives the classical system of an equilibrating mechanism to which we can look for correcting a disequilibrium. (There are, indeed, hints here and there in classical literature of an equilibrating mechanism, but these are never developed into a systematic theory). And if the essence of Patinkin's charge is that the classical model does not offer an explanation of behaviour in disequilibrium, then it can hardly be disputed. But for comparative statics—the classicists' parade ground—the classical model (without the real balance term) is consistent and yields determinate solutions.

Calcutta. PRANAL KUMAR BARDHAN

APPENDIX[9]

Linear Dependence of Homogeneous Excess Demand Functions. A Set of Equations

$$U_i = F_i(X_1, X_2, \ldots \ldots \ldots, X_m) \quad \ldots \quad \ldots \quad (8)$$
$$[i = 1, 2, \ldots \ldots \ldots, m]$$

is linearly dependent, when there exist m constants $c_1, c_2, \ldots, c_m$

that money received during a given economic period is repaid in the same period and hence, the holdings of cash balance at the beginning and the end of the period are zero. As Ball and Bodkin point out, 'It is hardly correct to say that the neo-classical equilibrium was a full stock equilibrium except for the trivial case of zero stocks, since characteristically the problems raised by the introduction of stocks into the model were not even considered.. (The) long period consumer equilibrium in a stationary state where one takes explicit account of stocks, is an extension proposed by the authors (Archibald and Lipsey), not a statement of standard neo-classical theory.'

It seems when Archibald and Lipsey state that 'the real part of the model tells us the volume of transactions for each set of relative prices if balances are in equilibrium' and that 'the money part of the model tells us what equilibrium balances are for each level of transactions,' they are not really talking about the classical dichotomy; their dichotomisation is more akin to what Patinkin considers to be a 'valid' dichotomisation of effects, than to the classical dichotomisation of *markets* (wrongly considered by Patinkin to be 'invalid').

which are independent of variables $X_1, X_2, \ldots\ldots, x_m$ and not all zero, and when the following equation holds,

$$C_1 F_1 + C_2 F_2 + \cdots \cdots + C_m F_m = 0$$

The necessary and sufficient condition for linear dependence of equations depends on the nature of the equations (8). When the equations are polynomials of the n-th order (n>1), the condition is that all the determinants of m-th order in the matrix composed of the first derivatives of the functions $U_1, U_2 \ldots\ldots, U_m$ in relation to the variables $X_1, X_2, \ldots\ldots, X_m$, respectively are zero.

$$\frac{\partial (F_1, F_2, \ldots\ldots, F_m)}{\partial (X_1, X_2, \ldots\ldots, F_m)} = 0$$

Now how about the linear dependence of the set of commodity equations ?

$$X_i (p_1, p_2, \cdots p_{n-1}) = 0 \quad (i = 1, 2, \ldots, n-1) \quad \ldots (9)$$

The Jacobian of (9)

$$\begin{bmatrix} \frac{\partial x_1}{\partial p_1} & \frac{\partial x_1}{\partial p_2} & \cdots & \cdots & \cdots & \frac{\partial x_1}{\partial p_{n-1}} \\ \frac{\partial x_2}{\partial p_1} & \frac{\partial x_2}{\partial p_2} & \cdots & \cdots & \cdots & \frac{\partial x_2}{\partial p_{n-1}} \\ \cdots & \cdots & \cdots & \cdots & \cdots & \cdots \\ \frac{\partial x_{n-1}}{\partial p_1} & \frac{\partial x_{n-1}}{\partial p_2} & \cdots & \cdots & \cdots & \frac{\partial x_{n-1}}{\partial p_{n-1}} \end{bmatrix} \quad (10)$$

is the determinant of the (n-1)-th order. Thus, according to the above rule, in order that the system of equations (9) should be linearly dependent, the determinant of the matrix (10) be zero.

As we know, the excess demand functions X_i (i=1,2,....n-1) are homogeneous of degree zero in relation to all prices ($P_1, P_2, \ldots, Pn\text{-}_1$).

Applying Euler's theorem on the homogeneous functions to X_i, we get

$$p_1 \frac{\partial x_i}{\partial p_1} + p_2 \frac{\partial x_i}{\partial p_2} + \cdots + p_{n-1} \frac{\partial x_i}{\partial p_{n-1}} = 0 \quad (11)$$

$$(i = 1, 2, \ldots, n\text{-}1)$$

[9] This Appendix is based on :

(1) Kurimura: *loc. cit.*

(2) Mosak: *General Equilibrium Theory in International Trade*, Appendix to Ch. VIII.

(3) Aitken: *Determinants and matrices.*

Applying the relation (11) to the Jacobian (10) we can prove that the determinant of the matrix (10) vanishes.

We know that the value of the determinant remains unchanged if we add to any row or column a multiple of any other row or column. Let us, therefore, multiply the first column of the matrix (10) by p_1 (introducing a factor $\frac{1}{p_1}$ on the outside) and add to it the elements in each column i multiplied by the corresponding price P_1. We then get

$$J = \frac{1}{p_1}\begin{vmatrix} \Sigma p_i \frac{\partial x_1}{\partial p_i} & \frac{\partial x_1}{\partial p_2} & \cdots & \frac{\partial x_1}{\partial p_{n-1}} \\ \Sigma p_i \frac{\partial x_2}{\partial p_i} & \frac{\partial x_2}{\partial p_2} & \cdots & \frac{\partial x_2}{\partial p_{n-1}} \\ \cdots\cdots & \cdots\cdots & \cdots & \cdots\cdots \\ \Sigma p_i \frac{\partial x_{n-1}}{\partial p_i} & \frac{\partial x_{n-1}}{\partial p_2} & \cdots & \frac{\partial x_{n-1}}{\partial p_{n-1}} \end{vmatrix} \qquad (10a)$$

By virtue of (11), the first column in (10a) consists of zeros, and the determinant of any array with a column of zeros is itself zero.

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Functions and working of the Industrial Finance Corporation of India.

Institutional Financing:

ONE of the major obstacles to industrialisation in pre-war days was the unwillingness of the dormant capital of the country to flow into productive channels and this was usually associated with the absence of appropriate institutions to mobilise the savings available. In the early years of our industrial development, the managing agents acted as the main source of capital. But individual capitalism today is for all practical purposes dead as dodo; personal financing has given place to institutional financing. To cope with the increasing demand for funds, special institutions have sprung up with an avowed aim to finance and promote new industrial undertakings. A study of "The Supply of capital Funds for Industrial Development in Europe" by the OEEC (Organisation for European Economic Cooperation) reveals beyond any doubt the world-wide tendency in this respect. To mention only a few, the Industrial and Commercial Finance Corporation, the Finance Corporation for Industry, the Commonwealth Development Finance Co., and the Colonial Development Corporation are all familar names to students of English economic history. In Germany there are institutions such as the IndustrieKredit Bank A.G. and the Kreditanstaldt Fuer Wiedaranfleau, often referred to as the I.K.B. and K.F.W. respectively. The rediscounting mechanism furnished by the central bank in France has found much favour with industrialists in that country. Similar institutions also exist in Italy, Belgium, Austria and other continental countries. Also, mention may be made of the Reconstruction Finance Corporation of the United States of America and the Industrial Development Bank of Canada. A few general features which seem to underlie the formation of such institutions may be pointed out here. Firstly, it may be stressed that these institutions have been established to fill up the gap noticed in the machinery for financing industrial development. Again, these institutions are not only organised on an autonomous basis, but also

perform a variety of functions such as promotion, underwriting, mortgage lending, subscribing to debentures, equity capital etc. Some of them make available technical advice to the newly started enterprises.

India, we may note, is not an exception to this and the aftermath of partition has witnessed the emergence of an array of financial corporations. There are at present six different corporations functioning in our country. They are the following : The Industrial Finance Corporation, the State Finance Corporations, the National Industrial Development Corporation, the Industrial Credit and Investment Corporation, the National Small Industries Corporation, and the Refinance Corporation. Let us confine our attention here to one such corporation, *viz.*, The Industrial Finance Corporation of India.

Progress so far :

It should be clearly borne in mind that the establishment of credit corporation in India, in no circumstance whatsoever, is to be looked upon as merely an accidental growth. Such a thing is the direct result of a deliberate policy pursued by the government to stimulate the growth of new industries and the expansion of existing ones. The need for the establishment of an All India Industrial Finance Corporation was felt as early as in the thirties of the present century by the Central Banking Enquiry Committee. The problem assumed a new fangled shape after the Second War and the present Industrial Finance Corporation was formed in July 1948 to provide medium and long term credit to industrial enterprises, 'particularly in circumstances where normal banking accommodation is inappropriate or recourse to capital issue channels impractiable.' It provides loan finance to public limited companies and co-operative societies only. Briefly, to recollect its fuctions, the corporation, (a) guarantees loans floated by industrial concerns, (b) underwrites shares and debentures, (c) grants loans and advances to them, and (d) acts as an agent for the Reserve Bank of India and the World Bank in respect of loans sanctioned by them to industrial enterprises. The capital structure of the corporation comprises of an authorised share capital of Rs. 10 crores divided into 20,000 shares of Rs. 5000 each and an issued and paid up capital of Rs. 5 crores contributed jointly by the Central Government, the Reserve Bank of India, the scheduled banks, co-operative banks, the (then) insurance companies, investment trusts and other financial institutions. It may be observed that the Central government has guaranteed the repayment of the principal and the payment of an annual rate of divident at 2¼% with regard to the amount invested in the corporation.

The corporation has completed twelve years and is in the 13th year of its working. To facilitate our study we may divide the progress made by the corporation into two periods : (i) the first ten years and (ii) the subsequent period. During the first decade of its existence the IFC received loan applications amounting to Rs. 124.33 crores, out of which

it sanctioned Rs.62.90 crores. Actual disbursements aggregated to Rs. 34.84 crores. The table at the end provides a detailed study of the corporation's progress during the first decade (1948-'49—1957-'58). It is evident that the progress recorded by the corporation has been rather slow and halting during the first five years, i.e., upto 1952-53. Loans sanctioned during this period averaged only Rs. 3.09 crores. The corporation made little progress in 1952-53, the amount of loans sanctioned for that year being Rs. 1.44 crores only. Actual disbursements of loan for this year seem to have gone up, compared to the preceding years. Two reasons were put forward for the slow progress in that year, *viz.*, that particular year, comparatively speaking, was a year of economic stagnation and that no application sanctioned during that year exceeded a sum of Rs. 25 lakhs. From 1953-54 onwards, the corporation marked a steady progress. The amount of loans sanctioned during the next five years 1953-58, recorded a significant increase on an average of Rs. 9.5 crores a year. A similar trend is also noticeable regarding the disbursement of loans. (Refer table).

During the year 1958-59, which marks the second period, we find a general decline in the activities of the corporation. Total amount of loans sanctioned came down to Rs. 3.79 crores—a noticeable decline from Rs. 7.79 crores, the previous year. There was also a fall in the number of loan applications from 48 (in 1957-58) to 26. The explanation as given by the chairman is that "only such industrial concerns as could at least hope to get the necessary import licences from government" applied for long term loans. It is pointed out that applications for loans to the extent of Rs. 6.15 crores had to be withdrawn simply because they could not obtain the necessary import licences. In addition they had at the end of the year loan applications aggregating to Rs. 6.30 crores, which, for want of necessary import licences, could not be taken up for scrutiny in that year. The next year witnessed the corporation being put on a firmer footing. The total amount of loans approved for the year was Rs. 17.92 crores, of which, in respect of Rs. 9.15 crores final sanctions were issued. The balance of Rs. 8.77 crores was held over pending receipt of government orders. The total amount approved (i.e. sanctioned) remains the highest figure reached by the corporation so far. (The previous highest, as seen in the table is in 1955-'56, the amount being Rs. 15.13 crores). Out of the total amount of Rs. 17.92 crores, Rs. 5.68 crores represent loans to concerns which obtained import licences during 1959-60.

A State-wise distribution of loans sanctioned by the IFC will show Bombay coming first, the amount sanctioned to that State being Rs. 18.69 crores upto June 1958. West Bengal, Madras, Bihar, Kerala Uttar Pradesh and Mysore come next in that order of importance. A noteworthy feature here is that industrially less advanced States like Madras, Orissa and the Punjab are being given increasing attention by the corporation in recent years.

Ways and Means Position:

To augment the funds at its disposal, the corporation applied for a loan from the Development Loan Fund of the United States Government. The Corporation was successful in obtaining a loan of 10 million Dollars from the D.L.F. for being sub-loaned to industrial concerns. This amount is to be utilised for approved projects in the private sector, in any industry except textiles including manufacture of wearing apparel, beverages, petroleum refineries and hotels. Each sub-loan sanctioned by the I.F.C. will have to be approved by the D.L.F. if the sub-loan exceeds two hundred and fifty thousand Dollars, roughly equal to Rs. 12 lakhs. The period of loan may range from 5 to 25 years. It will be interesting to note in this connection that as early as September 1960, the corporation had received requests for foreign exchange credit to the entire amount of the loan assistance received. As regards its rupee resources, it may be stated that the total amount of bonds outstanding as at the end of March, 1960 came up to Rs. 22.24 crores. The IFC's borrowing from the Reserve Bank of India under Section 21 (3)b* of the IFC Act were nil as on 31st March 1960, as against Rs. 0.94 crores the previous year.

The Corporation: An assessment:

We may now turn our attention to a few criticisms that are levelled against the working of the corporation. It is said that the corporation rejects a majority of applications received. The corporation authorities, in answering this, single out the following as the main reasons : (i) haphazard promotion of factories involving faulty financial planning and (ii) defective maintenance of account books by the borrowing concerns. In this context, it may be observed that the percentage of rejected applications to total has been brought down considerably in recent years. The percentage of applications sanctioned and rejected were 42% and 58% respectively during the first five years—out of a total 256 applications considered by the corporation, rejected applications totalled 148. The corresponding figures for a later period (i.e. the next four years) were 69% and 31%. (Total number of applications considered 218 ; sanctioned 151 ; rejected 67). This reduction from 58% to 31% is by no means insignificant. Another criticism that is usually cited is that though the corporation is empowered by statute to grant loans for a maximum period of 25 years, still the IFC in practice does not follow this. The maximum period for which loans have so far been sanctioned does not exceed 15 years. Hence it may be pointed out

* Under this section the IFC is empowered to boroow from the Reserve Bank for fixed periods not exceeding 18 months, upto a maximum of Rs. 3 crores against securities of the Central Government of any maturity or against bonds and debentures issued by the corporation, guaranteed by the Central Government and maturing within 18 months from the date on which money is borrowed.

here that the corporation can better serve the capital market by granting loans upto the maximum period permissible under the IFC Act. In the past, abuses were hurled against the corporation saying that it was guilty of nepotism in performing its functions. To enquire into this, a committee was appointed under the Chairmanship of Srimati Sucheta Kripalani in December, 1952, which reported in May, 1953. The findings of this Enquiry Committee revealed beyond any doubt that such charges were baseless. However, to prevent such a thing happening in future the Committee came forward with many helpful suggestions. One of them is that the concern, in which director of the IFC is the managing director or associated with the management, is not eligible to obtain loan facilities from the corporation. Yet another criticism relates to the delay involved in sanctioning loans. This is due to the fact that an application for loan has to pass through several stages. After being scrutinised at the head office, officers sent by the Corporation inspect the factory concerned. The head office then prepares a memorandum which is placed before the advisory committee, and the recommendations of this committee reach the central committee of the Board of Directors of the Corporation. Loans are sanctioned only on the basis of the recommendations of this committee. Thus the inordinate delay caused may be partly attributed to the lengthy procedure followed by the corporation. Hence there is an urgent necessity to cut this lengthy and round-about procedure adopted. The corporation should expedite the consideration of loan applications.

Further it is observed that the rate of interest charged by the corporation is rather high. The corporation charges 7% interest on its loans, with a rebate of ½%, if the instalment of interest and principal are paid within the due date. There is much substance in the argument pleading for a reduction in the rate. A burden of 6½% (effective rate) is quite a heavy one and it is time the corporation considers a reduction, to say 6%, with the usual reabate of ½%.

A study of the recent trends of the working of the corporation throws light on two new lines of activity which the corporation has entered, since 1958. They are : (i) underwriting of debentures and shares, and (ii) guaranteeing of deferred payments in respect of imports from abroad of plant and equipment by industrial concerns. In 1958, the corporation underwrote the issue of 6½% (subject to income tax) redeemable and convertible debentures for Rs. 1.60 crores—the corporation's share of commitment was Rs. 75 lakhs. This underwriting agreement was executed jointly with the ICIC and the LIC. Recently it also underwrote (i) 7½% (tax free) redeemable cumulative preference shares issue of Rs. 50 lakhs of a new industrial concern, jointly with 2 firms of stock and share brokers—the IFC's commitment in this came to Rs. 37.5 lakhs, and (ii) 7% (tax free) cumulative redeemable preference shares issue of Rs. 50 lakh. Also the corporation has agreed to underwrite an issue of 7% (tax free) cumulative redeemable

preference shares issue for Rs. 20 lakhs of a new unit engaged in sanitary wares production—the IFC's liability being restricted in this case to Rs. 10 lakhs.

Regarding the second aspect, it may be pointed out that up to march, 1960, the corporation approved 6 applications for guaranteeing deferred payments to the tune of Rs. 7.79 crores in respect of machinery and equipment to be imported from abroad. Also the corporation issued in one case a guarantee for deferred payment to the extent of Rs. 1.82 crores in respect of a proposal approved in 1958-1959. During 1958-59 the corporation approved 3 schemes for guranteeing deferred payments to the extent of Rs. 3.68 crores. (vide *Report on Currency and finance* for 1959-60, Reserve Bank of India).

Section 23 of the IFC Act, *inter alia*, authorises the corporation to underwrite shares and debentures of industrial concerns subject to one condition, namely, that it should dispose of such securities within seven years. It may be pointed out here that this seven year limit is an unnecessary one if the corporation is to be really of some service to the capital market in India. It is also striking to note that the corporation is prohibited from subscribing directly to the shares and stock of any company having limited liability. Such a prohibition has actually closed a profitable line of investment for the surplus funds with the corporation. It is suggested that the IFC Act should be suitably amended, thereby enabling the corporation to subscribe to the equity capital of approved industrial concerns directly.

To conclude, it may be remarked that the IFC is the biggest industrial mortgage lending institution in the whole of Asia. Considered in terms of the total funds available with the corporation—by any calculation, it exceeds Rs. 50 crores—it may be said that the corporation is bound to play a decisive part in the future financing of industrial enterprises in our country.

Madras T. V. SETHURAMAN

TABLE

Working of the Industrial Finance Corporation of India in the first decade (1948-'49 to 1957-'58)

(Rs. in crores)

Year As on 30th June	Applications received No.	Applications received Amount	Applications No.	Sanctioned amount	Amount disbursed
1948—49	95	10·32	21	3·42	1·33
1949—50	65	8·76	23	3·77	2·08
1950—51	45	5·48	17	2·38	2·38
1951—52	54	7·30	33	4·45	1·78
1952—53	74	8·26	14	1·44	2·50
1953—54	43	9·00	29	5·27	2·82
1954—55	46	11·27	27	7·34	1·64
1955—56	86	27·70	44	15·13	2·20
1956—57	67	21·36	51	11·91	9·78
1957—58	48	14·88	22	7·79	8·33
Total	623	124·33	281	62·90	34·84

Source : Compiled from figures given by chairman in the annual general meetings.

The Modus Operandi of the Bank Rate in the Post-war period.

It was in his 'Treatise on Money' that Keynes criticised the classical view about the working of the effects of the changes in the Central Bank discount rate. One can find as many explanations as there are writers in the field of monetary economics. Hawtrey emphasized the influence of Bank Rate changes on the decisions of the merchant while Hayek emphasized its impact on the structure of production through diversion of productive resources from one stage of production to the other. All these surmises about the modus operandi of the Bank Rate were made for explaining the cyclical fluctuations in business activity. These explanations failed to reason out correctly the failure of the cheap money policy as an anti-cyclical weapon in the hands of the authorities.

For carrying the effects of changes in the quantity of money brought about by the manipulations of the rates of interest to the levels of prices and business activity, there are needed certain transmission media. Firstly, the bank-reserve must undergo a change. Secondly, investment should respond to the changes in the rate of interest. Thirdly, there should not be too low a level of employment. Given the presence of the conditions as stated above, the effects of manipulations of the rate of interest will be transmitted to the levels of economic activity. These conditions were absent in the thirties.

These conditions are found present in the post-war period. In Western countries a very high level of national income has come to stay. The fluctuations that are taking place are surface fluctuations. It is, therefore, very interesting to study the effects of the changes in the rates of interest in the peculiar post-war conditions of high levels of income and employment.

The lessons of the experience gathered during the pre-war years weighed heavily on the policy-decisions in the post-war period. As a result, for a very long time the Bank Rate was left untouched while more reliance was placed on other direct control measures—both monetary and non-monetary. Throughout the earlier post-war period the countries which hesitated to use the Bank Rate as a means of control were enmeshed in speculation and balance of payment difficulties, while countries which resorted to the use of the rate of interest as an instrument of economic regulation could tide over their balance of payment difficulties. Not only that but they could build some reserves of foreign exchange. Thus, amongst the countries belonging to the European Payments Union it was Belgium which resorted earlier to Bank Rate as an economic regulator. The policy at once yielded the expected result. Other European countries tried to meet their balance of payment difficulties by devaluation. But it is now well established that devaluation could not be much helpful to remedy the European difficulties. Other European countries also later on especially from the beginning

of 1950's started plying on the technique of Bank Rate manipulations. Thus, U.K. raised its Bank Rate from 2.1 in 1951 to as high as 7.1 by September, 1957.

Inspite of increasing use of Bank Rate made by countries in recent years, the old established opinions about the efficacy of the Bank Rate technique have not changed. In this connection the opinions which were borne out by some of the witnesses examined by the Committee on the working of the Monetary system in U.K. popularly known as the Radcliffe Committee are worth noting. It was pointed out especially by businessmen that the changes in the rate of interest had no direct effects on their decisions (The Radcliffe Committee Report, His Majesty's Stationery Office, London, 1959, P. 158) This view about the reaction of the business community is the repeatition of an exactly similar view gathered by some of the Oxford Economists during the ending years of Nineteen Thirtees[1]. Whatever studies that are undertaken to investigate the effects of the rate of interest on the entrepreneurial decisions have led to the same conclusion irrespective of the prevailing economic situation i.e. whether it may be the period of depression or as in the post-war period there may be very high levels of income and employment.[2]

The Attitude of Businessmen during Inflation and Deflation:

The attitude of businessmen towards the changes in the rate of interest remains the same during deflation as well as inflation. This is because during the period of deflation as stated earlier there is no conductor to carry the effects of low rates to investment and incomes. During the period of inflation the marginal efficiency of capital being high the rise in the rate of interest does not defer the entrepreneurial decisions. Also a large amount of corporate investment is financed out of profits ploughed back. This sort of self-financing has made corporate business less dependent on market borrowing. It is therefore fruitless to look for any direct and conspicuous effects of interest rate changes on the investment decisions of entrepreneurs. This explanation based on direct effects of interest rate changes on business decisions does not tell the complete story. The direct effects may be absent in the case of very big businesses but they have to take into account the effects of the rate of interest on their customers too. If therefore big business does not take into consideration the direct and immediate effects it has to take note of indirect effects and, therefore, has to revise their investment plans. This point is supported by the experience in Britain as pointed out later in this article.

[1] P. W. S. Andrews—*Oxford Economic Papers*, No. 3, p. 48.

[2] See for the conclusions similar to those cited above—Man Mohan Singh, 'Monetary Policy in an Inflationary Economy,' *Indian Economic Journal*, July, 1959, pp. 28-43.

The supply of Money in the Post-War Period :

There is one important factor which discounted the rate of interest as an instrument of economic control in the post-war period. This is the huge amount of national debt. The increase in the Bank Rate and consequent rise in other rates deterred the authority from resorting to changes in Bank Rate. This consideration together with the notion inherited from the pre-war days about the inefficacy of the rate of interest induced the authorities *to tighter money* policy rather than *dearer money* policy. However, in the post-war period, supply of lonable funds is not restricted to the availability of bank-cash or even cash in general. It depends on the volume of liquid assets which is far greater than the volume of cash. This new factor in the supply of lonable funds is well-stressed by the Radcliffe Committee. If, therefore, the volume of liquid assets is to be successfully influenced, tighter money is not a suitable policy. The cost of credit plays an important role in such a situation. The Radcliffe Committee has therefore rightly insisted on the structure of interest rates rather than some notion of supply of money as he centre piece of monetary action. (Radcliffe Report, P. 134) It is difficult to influence the structure of interest rates without giving a lead to the market by suitable changes in the Central Bank discount rates. It is a common experience in all the countries that a change in the Bank rate immediately induces sympathetic changes in other market rates. A simultaneous rise in the various components of the rate pattern is necessary, for, in the absence of such an event, the mobility of cash from one type of asset with lower yield to another kind with higher yield cannot be stopped. It is this sort of mobility of cash which rendered the quantity of money almost without dimensions in the post-war period.

The Supply of Credit and Wages :

The second most desirable effect of Bank Rate changes is on the demand for higher wages. In the post-war period abundance of credit has encouraged the wage earners to push up wages. Comparatively cheaper credit makes possible the realization of higher wages. Lower rates in a period of high income and employment provide an assurance for increased investment if it is at all projected. This leads to the possibility of higher and fuller employment. The wage earners, therefore, being assured of their jobs, are placed in a fortified position to force their claims up. A rise in the Bank Rate brought about in time and in appropriate doze immediately influences the psychology of workers and curbs down their expectations of fuller employment.

Thus, in Britain the rise of the Bank Rate to the penal rate of 7% in September, 1957 had good effects on the demand for rise in wages. It is accepted on all hands that when resources are fully employed a general rise in prices is made possible only by expanding the supply of

money. The willingness of monetary authorities to expand the quantity of money to meet the demand for lonable funds at lower costs encourages both the employers and wage earners for competitive bidding for resources and higher wages. A rise in Bank Rate at once holds out a red signal to this inflation—induced demand for resources. The restriction in the supply of money as a consequence to the rise in the rates of interest raises the prospects of continuous unemployment if the wage earners continue pressing the wage-line upwards. In the absence of such a policy there is no danger of continuous and wider unemployment for if, as a sequence to the demand for higher wages, employment falls in one industry, the demobilised hands are at once absorbed in other expanding industrial sectors. A general discouragement to over-expansion can be brought about by monetary restraints and in the peculiar present assets structure of an economy the best course to bring about it is to play on the Bank Rate at the outset.

It is argued, and truly so, that a drastic rise in the rate structure curbs not only the enthusiasm of wage earners for pressing for higher wages but it also brings about a fall in output. This is no doubt the experience in Britain and also elsewhere. This simultaneous adverse effect on production that is produced by the Bank Rate changes, and consequent dearer money, acts as a deterrent to the authorities to press the monetary brakes. However, when the economy is functioning near about the level of full employment, a fall in output as a result of dearer money is not altogether a great discount to welfare. If the falling industries are producing goods which are essential to the basic needs of society they can be propped up by special aids by the Government. If galloping inflation and ultimate crash are to be avoided it is not at all undesirable that a period of two to three years of rising prices is followed by a short spell of falling prices. It is now well accepted that fuller employment and price stability are incompatible in a free economy. If therefore employment falls by a reasonable degree it would impart stability to the economy. This view is well accepted for policy in the U.S. both by the Democratic and Republican administrations. Since the passage of the Employment Act 1946 no administration tried to prop falling employment as a result of excessive wage rates by means of contracyclical policies.[3]

The British Experience:

Monetary restraint by dearer money gives an essential respite for economic consolidation. The British experience clearly points to such a conclusion. Britain today is more prosperous than it ever was during the post-war period. This prosperity it owes not to a little extent to an effective use of dearer money which it made from February

[3] D. W. Johnson, 'Wage Push Inflation Thesis,' *American Economic Review*, Dec. 1959, p. 1035.

1956 to June 1958. This experience in Britain has borne good lessons for the subsequent economic measures to curb inflation. Thus, inspite of very vague opinion as to the efficacy of Bank Rate expressed by the Radcliffe Committee, the authorities put up the Bank Rate from 4% to 5 % on January 21st last. This measure is criticised as untimely for there are no signs of inflation appearing in British economy at present. Such a criticism is not well-advised. In the post-war period, monetary measures failed to tell upon the economic situation because they were not appropriately timed. At present there are already signs of over-expansion based on increased in projected investments by industries. Thus an inflationary gap is already in sight. It is therefore in the fitness of things that a red signal should be held out to projected investment expenditure before it generates runaway inflation.

The Issue of Foreign Funds :

The recent changes in rediscount rates in Britain and Germany are directed to stop outflow of foreign capital. This is no doubt correct. But this does not mean that the rise in rates will not have and should not have any effect on domestic business activity and the level of prices. If domestic price level remains ever out of tune with the international price level no amount of rise in interest rate can conserve foreign exchange reserves in the absence of direct controls of capital movements. If free movement of capital is allowed, stabilization of foreign exchange holdings makes a disciplined price level the first imperative. Interest rate differantial provide only a stop gap palliative just as it was the case during the working of the international gold standard. The essential requirement for stable foreign holdings is the stability of the domestic economy by holding up its price line. It is impossible to have a rigorous check on money supply and prices without a rise in Bank Rate. Thus in Britain all measures collectively called 'Package Deal' were tried by the authorities to inspire confidence amongst the foreigners. But the package deal did not include one item *viz.* Bank Rate. The result was that sterling could not inspire confidence amongst the foreign holders.

The Effects on Investment :

As stated earlier the distrust about the efficacy of Bank Rate in the post-war period originates from its alleged weak influence on investment. This view is corroborated by Radcliffe Committee. However, the view put forward by the Radcliffe Committee does not represent a correct one. It is only an interpretation of the evidences borne out by business in response to a questionnaire sent out by Federation of British Industries and the Association of British Chambers of Commerce. (Radcliffe Report, pp. 159-61). This particular interpretation that the influence of Bank Rate changes on business decisions is not clear and definite may tell quite a different story if answers to particular questions

in the questionnaire are taken into consideration quite separately and independently of others. Thus, the answers by 30 % of the respondents to a question whether increase in the cost of borrowing induced them to reduce or pay off bank borrowing clearly indicated a positive and direct influence of the changes in the rates of interest. A reinterpretation of the survey referred to above points out to the conclusion "That nearly half of the 3400 firms surveyed for the Radcliffe Committee either did reduce their investment spending because of the rise in interest rates or would have done so had the high rates been retained a little longer."[4]

Conclusion :

The ideas formed during the thirties about the role of rate of interest as an instrument of economic regulation need revision in the post-war context of high income and employment. Cheaper money in such a period is a luxury which even richer countries cannot afford. This truth is now being widely accepted even in countries which in the earlier post-war period were much hesitant to do so. Looking to the positive deterrent effects of dearer money they should be viewed in all their ramifications. Viewed thus the psychological impact of the change in Bank Rate will be very important in addition to its purely financial impact. It is this change in the perspective that is most needed for an economic discipline. When the economy is working at high level it is subdueing rather than abrupt pulling down of the economic activity that is needed. The Bank Rate can meet this requirement if the time and magnitude of change are appropriately chosen. This does not mean that other measures shall not have to be called in action at all. But many other weapons can be spared if a judicious use of interest rates is made. The Radcliffe Report though otherwise critical strikes a note of faith and optimism for monetary policy in 1960's. "The mills of the monetary machine grind slowly, but they can grind surely". The first and most important key to that machine is the Bank Rate.

Rajkot J. H. ADHVARYU

A Note on National Council's Estimates of saving in India

I

The monograph on 'Saving in India' published by the National Council of Applied Economic Research early this year has attracted a good deal of attention recently. The findings of the monograph are so novel, and if correct, of such import that they require to be examined carefully.

[4] W. H. White, 'Bank Rate Vindicated,' *Bankers' Magazine*, August, 1950, p. 104.

Following the Reserve Bank's study of saving in India,[1] it was generally believed that savings in the Indian economy were growing rather sluggishly ; and everybody knew how small our saving effort has been, in relation to our dire need for the fastest possible step-up of investment. Saving was, by common agreement, supposed to be a most intractable bottleneck which has been keeping down the pace of our economic advance. And then, through this monograph, the National Council announced its findings that by 1957-58 our average saving-income ratio had been as high as 10 per cent, that the marginal saving-income ratio has been, over the past decade, as high as (perhaps higher than) 20 per cent, etc.

The monograph seeks to show that the absolute volume of saving, the average saving-income ratio and the marginal saving-income ratio during recent years have all actually been much above those estimated by the Reserve Bank or Planning Commission. Particularly "the marginal annual saving-income ratio appears to be in the neighbourhood of 20 per cent which is significantly higher than the estimate made last year by the Reserve Bank of India" (p.11). Let us see how far this claim is tenable even on the basis of National Council's own data.

Saving Estimates of National Council and the Reserve Bank of India

(*Rs. Crores*)

	National Council's Estimate		*Reserve Bank's Estimate*
	Indirect Estimate	*Direct Estimate*	
1948-49	320	N.A.	N.A.
1949-50	595	436	N.A.
1950-51	624	631	653
1951-52	510	524	508
1952-53	687	639	587
1953-54	717	617	561
1954-55	842	735	637
1955-56	1,135	1,029	814
1956-57	1,052	929	976
1957-58	1,211	1,071	791

[1] 'Estimates of Saving in the Indian Economy,' R.B.I. Bulletin, March, 1960.

The Reserve Bank estimates[2] suggest that between 1950-51 and 1957-58 the volume of savings grew from Rs. 653 crores to Rs. 791 crores, a rise of about 20 per cent. On the other hand the National Council claims that between 1948-49 and 1957-58, the volume of savings grew from Rs. 320 crores to Rs. 1210 crores an almost four-fold rise.

The base year for the national Council's indirect estimates is 1948-49. With this base, the 1957-58 figure gives the impression of a four-fold rise. But how much reliance can be placed on this figure of Rs. 320 crores for 1948-49? The monograph itself says "The estimates of some components of saving for the year 1948-49 are derived as a difference between aggregate data for the years 1947-48 and 1948-49". It further admits ".... the data for 1957-58 used for this purpose are very tenuous ...." (P.63). Obviously, it is, therefore, rather hazardous to place reliance on the figure of Rs. 320 crores and the almost 100 per cent increase claimed within two years from 1948-49 should be regarded as rather conjectural.

Since the Reserve Bank series begins from 1950-51, any valid comparison with the National Council can be from that year only. Thus, if the base of comparison is shifted from 1948-49 to 1950-51, the four-fold rise shown by the National Council estimates now shrinks to a more modest two-fold rise from Rs. 624 in 1950-51 to Rs. 1211 crores in 1957-58.

But, how much reliance can be placed on this latter figure of Rs. 1211 crores? The monograph says: "The data on some components of saving and investment for 1957-58 also are lacking in detail...." This is rather an understatement. For, as a look at the table on page 132 of the monograph reveals, the National Council had no data for individuals' saving in the form of direct physical assets (a component which accounts for about half the total national saving) for the year 1957-58; and so it put down the figure of Rs. 600 crores as a "rough estimate" as it puts it. How did it arrive at this figure? The monograph says "....all the available information for the *previous years* is used to derive the best possible estimates for 1957-58" (emphasis mine).

Long back in April 1959 Dr. V. V. Bhatt[3] and then again in March 1960 the Reserve Bank had come to the conclusion that compared to

[2] The National Council and the Reserve Bank have presented their estimates both in current and constant prices. However, for a comparison of the two estimates, we shall use the current prices data only because the constant prices data are, strictly speaking, not comparable as the Council's estimates are expressed in terms of 1952-53 prices and those of the Reserve Bank are expressed in 1948-49 prices.

[3] V. V. Bhatt, "Saving and Capital Formation" in *Economic Development and Cultural Change*, April, 1959.

1956-57, there was a drastic fall in the volume of savings in 1957-58. Not an unlikely thing, if we remember that while in 1956-57, the national income (in current prices) rose by 13.3 per cent, in 1957-58 it rose by a mere 0.7 per cent and in terms of constant prices it was the only year during the post-independence period when the national income recorded some fall, the per capita real income registering a fall of 3 per cent. In both these estimates, this alleged fall in saving in 1957-58 was discussed. It is surprising, therefore, that the National Council deems it fit to quietly extrapolate the data for the previous period, during which the savings rose steadily to derive an estimate for 1957-58.

What makes the matter more intriguing is that if we leave out the conjectural figures for 1948-49, 1949-50 and 1957-58, the Reserve Bank figures and the National Council figures for two end-years (i.e. for 1950-51 and 1956-57) are remarkably close to each other. The Reserve Bank estimate is a *direct* estimate and if, therefore, that estimate is compared with the *direct* estimate of the National Council, both in 1950-51 and 1956-57, the Reserve Bank estimate is slightly *higher* than that of the National Council.

There are some other anomalies also in the data compiled by the National Council which deserve to be noticed. Take for example, the data on Individuals' bank depoosits (table on page 89). The National Council had no other data than those supplied by the Reserve Bank; yet the National Council's estimates are different from those of Reserve Bank. A point to be noted is that while from 1950-51 to 1952-53, the National Council figures are lower than the Reserve Bank figures, in the later years (1953-54 to 1957-58) they are higher than the Reserve Bank figures. If, as it is claimed, the National Council's estimates are more comprehensive they should be consistently higher. But their being lower in earlier years and higher in later years looks rather strange. This needs some explanation.

II

Even if true, the implications of the National Council's estimates of savings are quite different from those which havee been generally drawn from them. The fact that we have been saving quite a lot more than we believed we did does not necessarily augur well for our future growth prospects. If, on a re-check of his personal account, a man finds that he had been saving more money than he thought he did, he would be fully justified in arguing this way. But, as Keynes pointed out a quarter of century back, what is true on micro-economic level may not be true on macro-economic level. Here, the whole thing turns on the axiomatic principle of the modern economic theory that saving and investment must, in *ex post* sense, always be equal.

In these terms, the Planning Commission says : we are saving about 8 per cent (all such percentages, unless otherwise specified, relate to aggregate domestic saving, foreign saving utilised by us or our investment all expressed as a proportion of our national income); we are borrowing from abroad about 2 per cent and thus our total investment is equal to 8 plus 2 i.e. 10 per cent.

Our investment target for 1965-66 has been fixed by the planning Commission at about 15 per cent. If we take credit for foreign aid of the order of say 3 per cent, our domestic saving rate has to increase from the current level of about 8 per cent to about 12 per cent i.e. a step up of about 4 per cent.

But if as the monograph suggests, our saving rate is already 10 per cent, can we say that in order to achieve Third Plan targets, the required step-up would now be only 2 per cent instead of 4 per cent ? The answer is clearly in a categorical negative.

In all its calculations, the Planning Commission has assumed that our investment rate is currently 10 per cent, of which about 8 per cent comes from domestic savings and 2 per cent from the savings of foreigners. Now the rub is, if you revise upwards the domestic saving estimate of the Planning Commission you will have to (in keeping with the principle of equality of saving and investment) revise your estimate of current investment correspondingly. With this revision it turns out that our current investment rate has been about 12 per cent, financed by 10 per cent from the domestic saving and 2 per cent from the savings of the foreigners.

But if you revise the current investment estimate, you have to *pro tanto* revise the investment target for 1965-66 also. For, with the current investment amounting to about 10 per cent of our national income, we have a certain rate of growth of national income. Now, if we want to increase our national income say by 30 per cent by 1965-66, we have to increase the rate of our investment. The Planning Commission estimated that this *step-up* will have to be of the order of 5 per cent. Therefore, if, following monograph's findings, we revise upwards the estimate of our current investment from 10 per cent to 12 per cent, we will have to correspondingly revise the investment target from the Planning Commission's figure of 15 per cent to something like 17 to 18 per cent to provide for the necessary step up in the investment.

In short, if you want to achieve the targets of the Third Five Year Plan, you must step up the investment ; and if you revise the estimate of current investment, you must correspondingly revise the 1965-66 target for investment also to provide for the necessary step-up. The problem, then, remains as acute as it was before.

But, that is still not the end of matter, for, if we do accept the National Council's findings, their further implications are literally terrifying. During the decade of planning, our national income has been rising roughly at the rate of about 3.5 per cent per year. During the same period, the rate of investment has risen, according to the Planning Commission from about 5 per cent to about 10 per cent of the National Income. That gives an incremental investment-output ratio of about 3 to 3.5. If, on the other hand, we accept the conclusion of the National Council that saving-and-investment have been rising much faster than is envisaged by the Planning Commission, an extremely unhappy result follow : *viz.* the incremental capital-output ratio has been much higher than we thought before. If so, the volume of investment, and correspondingly, the step up of investment required to achieve the income target (i.e. 30 to 34 per cent increase over the Third Plan period), will have to be fantastically larger than has been envisaged by the Planning Commission. Far from signalling any happier prospects for us, the estimates, if true, spell a calamity for us.

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